

Role-taking and Social Connectedness in Autism

by

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To Angel Rivière

Abstract

The aim of this thesis was to examine aspects of conceptual and non-inferential role-taking that are intact or limited in individuals with autism. More specifically, this thesis examined the ability to adopt different psychological perspectives, based on the hypothesis that basic non-inferential role-taking processes, related to the way we identify with the attitudes and feelings of other people, are relatively lacking in individuals with autism. Such processes might be important for the understanding of different perspectives in other people.

The series of studies presented in this thesis investigated role-taking in individuals with autism, relative to chronological and verbal mental age matched groups of participants without autism. The studies focused on three main areas of research: narrative role-taking, deictic understanding, and interpersonal non-verbal communication. In the first study, participants were asked to tell stories from the point of view of different characters. In the second study, a set of tasks examined production and comprehension of verbal and non-verbal deictic expressions. The third study examined the processes of interpersonal engagement and role-taking, by focusing on the non-verbal communication exchanged between two people in the context of a one-to-one interaction.

The results from the studies provide evidence suggesting that individuals with autism show aspects of role-taking ability that are both limited and intact, which may be better explained by an impairment in interpersonal, and non-inferential role-taking, than by cognitive, and conceptual, limitations.

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CHAPTER ONE

The nature of social role-taking

1.1 Introduction

Role-taking is about being able to stand in the other person's shoes, and have a sense of what that person sees, thinks and feels. More precisely, is the ability to differentiate the perspectives and attitudes of ourselves and others. This ability unfolds during the first years of life and provides the child with the necessary concepts to think about the thoughts and feelings of other people. This is conceptual role-taking. On the other hand, the appreciation of the subjective orientation of another person (i.e. the intersubjective 'feel' of the internal perspective of another person) has been suggested to be another form of role-taking, which is non-inferential in nature. It is non-inferential, because it is not reasoned as it were, but felt. Such non-inferential role-taking is embedded in early patterns of co-ordinated interaction between infant and caregiver, whereby infants are pulled into the psychological stance and attitudes of the adult through feelings. Such mutual coordination is a reflection of the impact of interpersonal connectedness on both child and adult. The present thesis explores the view that this subjective experience of other people's feeling and attitudes through interpersonal engagement is the basis of the child's understanding of self and other. The approach to be taken is an investigation of early childhood autism.

Autism is a condition beginning very early in life, and initially described as a 'disorder of affective contact' (Kanner, 1943, P.250), in which the capacity for interpersonal relations and emotional connectedness with others is impaired. Children with autism suffer from a profound lack of interpersonal relatedness, one that may have important developmental links to their difficulties with psychological perspective-taking. The purpose of the present thesis is to examine the capacity for several aspects of role-taking among children with autism (relative to children without autism) in order to explore the significance of affective and interpersonal contact for the ability to differentiate and move between psychological perspectives. The limitations in role-

taking of children with autism will be examined by focusing on three main areas of research: a) narrative role-taking, b) deictic understanding, and c) interpersonal non-verbal communication.

1.2 The definition of role-taking

Role-taking is broadly defined as the ability to differentiate between different individuals' psychological perspectives. We can make a distinction between interpersonal and cognitive aspects of this ability. On the one hand, role-taking has been considered to reflect cognitive processes that allow us to think using concepts or representations of the mental states or psychological perspectives of others, referred to as conceptual role-taking. On the other hand, there are aspects of role-taking that are more experiential, and involve an appreciation of the feelings and attitudes of others through personal or intersubjective contact, referred to as non-inferential role-taking.

Although it is controversial to consider the earliest forms of interpersonal engagement between a caregiver and an infant as expressions of 'role-taking', I shall re-examine this area of study from the point of view of role-taking in order to highlight possible continuities between early person-to-person relations and later, more explicit, forms of perspective-taking.

1.2.1- Non-inferential Role-taking

Perceiving the psychological perspectives of other persons is not necessarily inferential. We not only think about the mental lives of others, we can 'feel' them. For example, we feel moved by the attitudes of others, as when encountering someone who is hurt or afraid. This process involves

moving into and adopting the emotional or subjective perspective of another person, and experiencing that perspective oneself. Arguably, this non-inferential form of role-taking, perhaps the earliest and most basic form of role-taking (Hobson, 2002), is present from the earliest months where baby and caregiver engage in co-ordinated affective exchanges. This has been suggested to be an early form of role-taking, which is non-inferential and emotionally regulated. Trevarthen (1979) used the phrase *primary intersubjectivity* to describe this emotional dance that takes place between infant and caregiver in the earliest months of life, whereby each partner is—in a sense—moved by the other during one-to-one interactions. This can be likened to a dance in that babies and their caregivers respond to one another in a co-ordinated and attuned manner. Infant-caregiver dyads respond positively to and seek to achieve synchrony. As early as ten weeks of age, infants are responsive to emotional expressions in their mothers (Haviland and Lelwica, 1987). When mothers show joy in their expressions, their babies tend to show increased joy. And the same happens with other emotional expressions such as sadness or anger. Infants begin life with a propensity to selectively attend to people, and are moved by others through reciprocal regulation of affective exchange. This same co-regulation of affective engagement with others appears to underlie much of interpersonal contact throughout life. Within social play, for example, between the ages of three and nine months infants and caregivers participate in a process of affective matching with bi-directional influence in which each partner responds to changes in the other (Tronick *et al.* 1982.).

In an innovative study of this process, Murray and Trevarthen (1985) examined the responses of three-month-old infants engaged in a face-to-face interaction with their mothers, when their mothers either became unresponsive toward their infants or their responses appeared desynchronised with the child's responses. In one experiment, the authors examined 'normal' face-to-face interactions, where mothers were simply instructed to engage ('chat') with their babies normally for a brief period of time. Then an interruption was imposed, where an

experimenter asked the mother some questions in order to create a 'naturalistic' break between mother and baby. Following this 'interruption' period, mothers resumed contact with their infants. Then, mothers were instructed to assume a still-face and become unresponsive to, while continuing to look at, their infants for 45 seconds. This blank-face period was followed by a final phase of normal interaction. The authors found that, preceding the interruptions, babies engaged in positive interactions with their mothers, characterised by frequent smiles and wide open shaping of the mouth that are typical to find in infants during infant-caregiver interaction (Brazelton *et al.* 1974; Stern, 1974; Trevarthen, 1979; Trevarthen *et al.* 1981) and engaged in long sustained and continuous looks. Although attention to their mothers decreased during the naturalistic interruption, babies did not become withdrawn or distressed. A very different pattern, however, emerged during the still or blank face phase of this procedure. Almost immediately, infants became markedly distressed, displayed fleeting glances, and then withdrew. In a second experiment, infants and mothers were placed in separate rooms and interacted with each other through closed circuit television monitors. Initially, mother and infant engaged in a live sequence characterised by normal interaction. After 30 seconds, however, the tape was rewound and infants observed a replay version of their mothers, completely uncoordinated from their current behaviour. It turned out that, as in the still-face procedure described above, infants who had been content in the live interaction via television monitor were noticeably distressed by the replay. They turned away from their mothers and showed shorter, fleeting glances. Murray and Trevarthen (1985) concluded that through an "*emotional mechanism that regulates interpersonal contacts and relationships from the early weeks of life*" (p. 195), young infants are sensitively attuned to "*the immediate affective quality of maternal behaviour*" (p. 191).

Following the first few months of life, infants begin to increasingly attend to objects in the world, outside of the dyadic interaction with their caregivers (Trevarthen and Hubley, 1978). Then from around 6 months, when infants begin to follow the gaze and head turn of an adult (Scaife and

Bruner, 1975), we can begin to see relations that are more clearly related to role-taking, in that the child's orientation appears to be affected by the orientation of someone else. This new phase of *secondary intersubjectivity* (Trevarthen and Hubley, 1978), involves the coordination and sharing of infant-caregiver understanding about objects and events.

Around 9 months, infants move from sharing affect in face-to-face exchange to show a capacity for sharing subjective states regarding objects and events in the world. For example, they begin to engage in social referencing, whereby they look to caregivers for emotional cues to guide their reactions to events in the world. In one experiment, 12-month-old infants were placed on a visual cliff -created by a glass surface connecting two tables giving the appearance of a drop-off- while their mother was standing on the other side of the cliff (Sorce *et al.* 1985). The infants looked to the mother's face immediately after they noticed the drop-off of the cliff. The majority of infants (14 out of 19 who were met with a happy face) proceeded forward if their mother displayed a happy expression, but refused to cross to the other side if she displayed a fearful expression (not one of the 17 children who were met with a fearful face, crossed over the cliff). Social referencing illustrates how infants incorporate the attitudes of others to regulate their own behaviour, a process which is regulated by a non-inferential form of role-taking.

Not only do infants engage in social referencing, as described above, but they participate in interpersonal interchanges with another person concerning the world around them. One important aspect of secondary intersubjectivity is joint attention, a process through which the infant coordinates attention with others toward the world, either by following into or directing the attention of others. Infants not only observe and follow into the attentional focus of others, they also engage in showing, pointing, and alternation of gaze for purposes of co-ordinating attention and sharing experiences (Bates, 1979). Both partners have a mutual awareness about the

psychological orientation of the other, and communicate with each other about the world through the coordination of attitudes.

Another example of the child's initial 'awareness' of the psychological perspectives of other people is evident in new forms of play between infant and adult. Games like peek-a-boo or rolling a ball back and forth, enable the child to switch roles. With these kinds of interactions the infant learns that the exchange is reciprocal and that he/she can either be the one taking the lead or following. Through playing games, the child "*is identifying with the adult by doing the kind of thing that she has observed the adult do in relation to herself*" (Hobson, 2002, p.74). Thus, perhaps through forms of non-inferential role-taking, the child is pulled into the subjective perspective of another person, where the adult's attitude becomes the child's own attitude in both primary and secondary intersubjectivity.

1.2.2- Conceptual Role-taking

The conceptual view on role-taking focuses upon the fact that humans develop a cognitive ability to think about what another person might be seeing, thinking, or believing. This view can be traced back to Piaget's theory of cognitive development. According to Piaget (Piaget, 1926), young children spend the first several years of life unable to appreciate the difference between their own and another's perspective. One of the main characteristics of preoperational thought is egocentrism, or the inability to see a situation from an alternative viewpoint. Piaget demonstrated egocentric thinking with his classic 'Three-Mountains-Problem' in which a child, seated across from an examiner with three differently coloured and designed mountains in between, is unable to distinguish between what he/she and the examiner might see, and instead selects a photo (or gives a description) corresponding to his own viewpoint, regardless of whose viewpoint he has been asked to describe. Unaware of the differing perspectives of other people, Piaget supposed, the

preschool age child is constrained to one aspect, or view, of a situation at a time. Concurrently, the preschool child also fails class inclusion problems and conservation tasks due to the inability to decentre, or to consider more than one aspect of the perceptual field at a time.

Piaget described concrete operational thought as the new quality of mind that emerges in middle childhood in which thinking becomes 'two-sided' and the child is able to simultaneously consider and coordinate multiple viewpoints on a given situation. This leap in cognitive ability, the progression to concrete operational thinking, allows the child to understand and comprehend how others see things. The development of the capacity for perspective-taking as outlined by Piaget was largely impersonal, as it focused more on the relationship between subject and object than on the relationship between persons.

This conceptual role-taking account was further developed by Flavell (1974) who—like Piaget—gave a largely impersonal account of how children come to understand alternative orientations to the world. Using both pre-existing knowledge of how people behave in various situations and the perception of certain attributes in others, the child gathers information about the internal perspectives of other people. Flavell (1974) described a developmental sequence through which this skill emerges. At the first level, the young child learns about differing visual perspectives. At this stage, the child can describe which object a person sees, but not their particular view of the object. For example, even a two-year-old child appreciates that someone who is blindfolded or not looking will be unable to see an object (Lempers *et al.* 1977). The second level brings with it an ability to comprehend and appreciate multiple perspectives on the same object. Depending on the orientation, different people can see the same object differently. At the final level, which does not occur before age eight, the child is able to represent the apparent size and shape of the objects as seen by others. In other words, the development of perspective-taking ability culminates in the ability to represent another's visual perspective.

Such an account is heavily focused on the child's developing ability to appreciate differing visual perspectives. However, role-taking involves more than the capacity to represent the perceptual experience of another person. As Shantz (1975) suggested, the ability to judge what another person might see is a very different matter from the capacity to pick up on their possible thoughts, feelings, or intentions. Indeed, the ability to comprehend and even represent differing visual viewpoints may be present well before concrete operational thought and appears to be relatively intact among children with autism (Hobson, 1983; Baron-Cohen, 1989). Beyond simply judging what another person can see, role-taking also involves the ability to appreciate what others might think, feel, intend, or desire. The ability to attribute beliefs, desires, or intentions to oneself and others, referred to as 'theory of mind', allows human beings to make sense of and predict the behaviour of others by virtue of inferences about their mental states. For example, while leaving the house you might have observed your friend absentmindedly pick up her library card and place it into her pocket. When, upon entering the bus, she retrieves the library card and begins to show it to the driver, it becomes evident to you that she thinks she has retrieved her travel card (not the library card in her hand) and will soon be surprised to hear that she is expected to pay for this bus ride. This form of conceptual role-taking allows us to make sense of situations like this, with representations of other people (and their behaviour) in terms of their beliefs, desires, intentions, and emotions.

The concept of 'theory of mind' was introduced by Premack and Woodruff (1978), who suggested that an adult female chimpanzee, Sarah, was able to impute mental states to a human actor. Reportedly, Sarah was able to make sense of the actor's behaviour by inferring intentions. Initially, research on the theory of mind concept focused on when children come to understand false belief, a belief that does not correspond to reality. For example, an early study of false belief reported by Wimmer and Perner (1983) presented 3- and 4-year-old children with a doll (Maxi)

who put some chocolate into a green cupboard and then went to the playground. While he was away, Maxi's mother (another doll) used the chocolate for baking a cake, and then put it into the blue cupboard. When asked where Maxi would look for the chocolate when he returned from the playground, hungry for a snack, 3-year-old children maintained that he would look in the blue cupboard (where the chocolate really was) rather than the green cupboard (where he had last seen it and ought to have expected it to be), whereas the majority of 4-year-old children responded that Maxi would look in the green cupboard. A number of studies indicate the onset of the ability to pass such false-belief tasks at around the age of four (Wimmer and Perner, 1983; Perner *et al.* 1987; Hogrefe *et al.* 1986), but others have explored how toddlers show some knowledge of the wishes and desires of others, for example knowing that finding an attractive object would make a doll feel happy, but finding nothing would leave the doll feeling sad (Wellman, 1990). There are also investigations that suggest early forms of such understanding, especially in relation to intentions, even before toddlerhood (e.g. Meltzoff, 1993). Very young children, therefore, appear to understand people as having psychological orientations to the world (including intentions) early in life, and are able to talk about the mental states and feelings of other people, even when they are contradictory to their own, or to the actual state of affairs. Conceptual role-taking is but one expression of young children's skills in these domains.

1.3 Theories about the development of role-taking

Both non-inferential and conceptual role-taking overlap and interact with each other. Two main theories have tried to explain the developmental pathway of both non-inferential and conceptual role-taking, and their impact on the development of the child's understanding of other minds and perspectives. These theories are the 'interpersonal' theory, and the 'theory of mind' theory.

1.3.1- The Interpersonal Theory

An interpersonal theory of the child's understanding or grasp of alternative viewpoints for considering the world holds that what begins between people becomes internalised into the child's thinking. Vygotsky (1979) suggested that development proceeds through dialectical engagement in a social context, so that the child's sense of self begins through relations with others. By relating to (and through) other people's ways of relating to the world, it is suggested, the child comes to appreciate that the world can be viewed from different attitudes and perspectives, that seeing is really '*seeing as*' (Hobson, 1990). The child internalises this process to his/her own thinking and is able to move between numerous ways of '*seeing as*' in relation to the world, along with the developing capacity to pretend and to adopt multiple orientations on the world. Along these lines, as Mead (Mead, 1934) claimed, we become self aware through internalising the attitudes of others towards ourselves.

These views hold that our understanding of self and other evolves through interaction with others. Whereas the theory of mind theories consider the child's development in representational thinking to be the primary factor that gives rise to the child's social understanding and self-other awareness, interpersonal theories consider the child's social relatedness, relating to other persons with differing subjective orientations toward the self and world, to be the primary factor that drives this development. Along these lines, Hobson (2002) wrote the following:

"Thinking arises out of repeated experiences of 'moving' from one psychological stance to another in relation to things and events. Critically important is the kind of mental movement involved. It is not enough that the baby shifts perspectives by herself. In order to grasp that she can move in her attitudes to the world, the movements need to happen 'through someone else'." (p.105).

Infants begin their lives involved in social interactions that entail an interchange of feelings and attitudes with others. Feelings of social connectedness are one of the outcomes of such interchanges. According to Hobson, the infant is repeatedly moved by other people's feelings and attitudes, and then experiences those movements in her self. It is through repeated movements to the other person's perspective and orientation that the infant becomes gradually aware of her own and other perspectives. The process underlying such movements is the mechanism of identification.

The term *identification* refers to the way in which we not only perceive but also respond to and adopt the subjective orientations of others. In other words, we become temporarily anchored in the stance of someone else, while maintaining our own psychological stance (Hobson & Lee, 1999). To identify with other people is to experience and even adopt aspects of their attitude and feelings. This process of identification not only changes the infant's actions, it also shapes the infant's subjective experience of the world. Hobson puts forth the claim that primary intersubjectivity (i.e. person-person interaction) is the basis for secondary intersubjectivity (person-person-world interaction), and that identification provides the vehicle through which these processes are possible. He gives particular emphasis to person-person-world interactions to explain how the child adopts and assumes different perspectives, and exemplifies this process with a diagram, the *relatedness triangle* (See Figure 1.1).

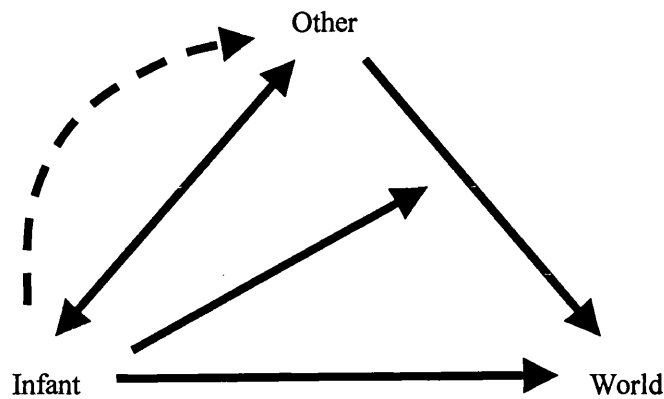


Figure 1.1 Hobson's relatedness triangle (2002)

Returning to the visual cliff example (Sorce *et al.* 1985), described earlier, we can re-examine social referencing through the lens of the relatedness triangle. First, the child is presented with an ambiguous and potentially threatening situation, the visual cliff, and does not know what to do. Feeling uncertain, he looks to his mother to determine her affective orientation toward this puzzling situation. His mother (as instructed by the experimenters) displays an attitude in relation to the cliff (e.g. a happy and encouraging expression), which is immediately not only perceived but also adopted by her infant. The double arrow shows the child's appreciation of his mother's attitude. In this way, the infant relates to his mother's way of relating to the cliff and feeling courageous, decides to cross over the cliff. Experiencing his mother's attitude, and adopting it as his own, has modified the child's way of relating to the world. His mother's attitude toward an object has become his own. However, the child needs to experience repeated movements of this kind before he/she can shift between multiple psychological viewpoints simultaneously on his own. The curve and dotted arrow of Hobson's relatedness triangle does not take place until the child has gradually assumed the attitude of another person as an attitude from outside him/herself. Thus, the child begins developing a sense of separateness between his/her own perspective and

the perspective of another person, which does not involve thinking and is non-inferential in nature. The child's awareness of different perspectives will become gradually integrated into the child's thinking when the child evolves the concepts to understand and talk about other minds. In Hobson's view, the developing of a theory of mind is based on this non-inferential role-taking. Identification is the process that pulls the child into the perspectives of other people, and it is the process underlying non-inferential role-taking

Thus, the ability to simultaneously shift between various psychological perspectives and stances emerges directly from interpersonal encounters, where the infant experiences other people's attitudes and feeling toward oneself and toward a shared outside world. It is through the process of identification with other people that the infant develops the awareness not only of similarities, but also the distinctions between self and others (Bretherton *et al.* 1981). Identification pulls the child temporarily into the perspectives of others. Such basic role-taking may form the basis for the subsequent development of conceptual role-taking, where the child shows the capacity to understand that persons have minds and that one thing can represent another as in symbolic play (Hobson, 1993). And the developing child, in gaining self-reflective awareness, comes to realize that he/she can initiate movements and shifts into multiple roles and orientations.

1.3.2- Theory of Mind Theory

According to the 'theory of mind' theory, we understand other people when we have the concepts to think and talk about their internal mental states, such as beliefs, desires, intentions and emotions. There are differing views regarding the developmental pathway leading to theory of mind.

Metarepresentation, or the capacity to form high-order representations, has been suggested as the developmental basis for the capacity for theory of mind. There have been two different views about what is meant by metarepresentation. The first definition was given by Pylyshyn (1978), following on the study of Premack and Woodruff (1978). He defined the metarepresentational capacity as *'the ability to represent the representational relation itself'*. For example, a photograph of the painting 'Venus at her mirror' is a representation of a representation, but not a meta-representation. My belief that you think that 'Venus at her mirror' was painted by Diego Velazquez is a metarepresentation, or what is the same, a representation of your belief. According to Pylyshyn, a metarepresentation entails a representation (e.g. the proposition *'Venus in front of mirror' was painted by Diego Velazquez'*) of a relational representation (e.g. the proposition *'the fact that I believe that you know it'*). This perspective considers a metarepresentation as an advanced form of representation that involves representing representational relations among different verbal propositions like the ones presented above.

Josef Perner (1991), who has included this definition of metarepresentation in his theory, distinguished three important moments in the development of representations in the young child. During the first year of life, infants use primary representations of the world, that is to say, simple representations of their perception of objects or events. From the second year, young children begin using secondary representations, that is to say, the representation of more than one representation at the same time. The understanding of object permanence or means-ends relationships is an indication that the child is forming secondary representations. With this type of representation the child is able to understand to some extent that other people's behaviour is guided through their internal states of knowledge and desires, but they are not able yet to understand the properties of the representational relation. This metarepresentational process does not become evident until the age of around four years.

One of the most influential theories in explaining the origins of theory of mind is that of Leslie (1987), whose definition of metarepresentation differed from previous accounts in that it is not a representation of a representational relation, but a new representation that holds two meanings at once, the real and the pretend. Leslie (1987) linked the onset of the capacity for metarepresentation with the child's ability to pretend, or to '*manipulate attitudes toward information*' (p. 416). For Leslie, the metarepresentational mechanism is a modular system that is independent of other capacities. This means that the module that allows metarepresentation begins to function as the child matures. This metarepresentational system allows the decoupling of primary representations from their real meaning. Leslie argued that there is a similarity between the ability to understand mental states such as belief (e.g. '*Paul thinks that the Queen of England is called Margaret*') and the symbolic play of the child (e.g. '*Paul pretends that a banana is a telephone*'). In both instances, the real meaning of some thing is lifted out and replaced by other possible meanings. Leslie proposed that the emergence of a decoupling mechanism, being able to simultaneously acknowledge two perspectives, underlies the ability to pretend and play and is also the basis for the child's understanding that other people have minds. He also suggested that there was an autism-specific deficit in this decoupling mechanism.

In recent years, the definition of theory of mind has broadened to include a developmental perspective viewing its emergence as one milestone in a complex, unfolding understanding of persons (Flavell *et al*, 1999). For example, it has been suggested that joint attention—the sharing of attention and experiences with others regarding events in the world—may be an important early developmental precursor to theory of mind. In this case, at a purely cognitive level of explanation, the child manifests awareness and understanding of both his and another's attention or perspective toward outside objects. The child's 'awareness' of a link between adults and objects, by representing others as seeing or attending, could be one of the first steps in the child's evolving theory of mind (Baron-Cohen *et al*. 1985). Therefore, the theory of mind theory

considers the child's understanding of different points of views and perspectives in other people as an outcome of previous cognitive developments. It also considers the child's social understanding to be conceptual in nature, that is to say, the child needs to have concepts before he can have this level of awareness of self and other.

1.4- The case of autism: outline of this thesis.

Autism is a developmental disorder that is characterized by severe limitations in social relations, language and communication, and imagination (including play). The language of the majority of individuals with autism who speak is abnormal, and the disorder usually presents with unusual repetitive preoccupations and rituals. The ability to understand mental states in the self and others, known as theory of mind, has been well documented as an impaired ability in autism (to be discussed in Chapter 2). Yet, deficits in social responsiveness and intersubjective contact with others are apparent in autism long before the age at which typically developing children pass theory of mind tasks.

Individuals with autism have been reported to have profound difficulties in adopting the role of another person. Understanding that other people have separate internal perspectives allows us to move flexibly among different perspectives and put ourselves into another person's shoes. The present thesis will explore both the theory of mind and the interpersonal theories to explain the difficulties of individuals with autism in appreciating and understanding the psychological and emotional stance of others. The hypothesis of this thesis is founded on the interpersonal theory regarding the origin of the role-taking impairment in people with autism, which suggests that individuals with autism have profound limitations in understanding other perspectives because they fail to identify and to move to the perspective of another person from very early in life.

Chapter 2 will review the case of autism, by detailing the clinical features of the syndrome. It will outline the relevance of the theory of mind and interpersonal theories for understanding the role-taking deficits in this disorder.

The first study will be presented in Chapter 3, and will focus on the ability to adopt roles in a narrative, story-telling task. Most of the studies that have examined the ability to take the role of another person in individuals with autism have focused on their pragmatic use of language, where adjustment in language may depend upon mutual understanding between speaker and listener (Baltaxe, 1977; Menyuk, 1969; Prutting, 1982; Loveland *et al.* 1990, Tager-Flusberg, 1981), or they have focused on their use and understanding of mental state terms in theory of mind tasks (Tager-Flusberg, 1992, 1995). However, it is uncertain whether these processes account for the ability to adopt another person's role or perspective. Although individuals with autism show deficits in the pragmatic use of language and in understanding mental state terms, as evidenced in these studies, there is not scientific evidence regarding whether they can take the role of another person in a task when asked to do so.

Therefore, Chapter 3 will aim to examine the ability to adopt the roles and perspectives of different characters in narrative. The hypothesis underlying this study is that by virtue of experiencing the perspectives of other people and by identifying with them, we develop the ability to take the role of another person and move flexibly between different viewpoints. A further hypothesis is that individuals with autism have difficulties in identifying with other people in this way. Therefore, it was predicted that they would have limitations in adopting different roles, when asked to make up stories with three human figures made of cardboard, and retell the stories from the perspective of different characters. The organization of the stories in relation to the perspectives of different characters may reveal aspects of role-taking that are limited in individuals with autism, as well as aspects that are intact and therefore arguably less influenced

by interpersonal contact with others. Indeed, participants with autism were expected to perform well in other, more cognitive rather than interpersonal, parts of the task (e.g. maintaining the content of one story when retelling the same story from the point of view of another character, what will be called “co-ordination”).

A second set of studies will be described in Chapters 4 and 5, which will explore role-taking in the context of expressing and comprehending deictic expressions. This set of four experiments had the aim of examining the use and understanding of these expressions in individuals with autism, compared with a closely matched group of non-autistic individuals according to age and language ability. The ability to take into account aspects of another person’s thoughts and feelings is fundamental to the success of social interactions, where some aspects of language are modified in accordance with another person’s psychological and spatial perspective, a defining characteristic of deictic expressions. Deictic linguistic expressions are terms such as here/there, this/that, come/go, bring/take that shift depending on who the speaker is and on the spatial relation between the speaker and the listener. There are also deictic (‘pointing’) non-verbal expressions, such as a point or a nod that refer to something. It is important to examine deictic expressions in individuals with autism because of the lack of empirical research in this area, even though person-centred expressions are critical for communication. The interpersonal theory suggests that one needs to identify with the speaker who uses a deictic expression (like ‘there’ while pointing to an object), and assume his/her perspective before having a full understanding of such expression. If this is correct, deictic expressions are also expressions of role-taking. If individuals with autism have limited experience of other people, then it is reasonable to assume that they may show difficulties in using and comprehending such expressions.

Chapter 4 will include one experiment (Experiment 1) that was designed to examine the production of deictic expressions, and in particular, whether or not individuals with autism use verbal (e.g. 'there') and non-verbal (e.g. a pointing) deictic expressions.

Chapter 5 describes three experiments of the deixis study that aim to study the comprehension of deictic expressions. Experiment two examines the comprehension of the deictic terms 'come' and 'bring', which involve a movement towards the speaker. Experiment three was designed to study comprehension of both verbal and non-verbal deictic expressions, such as the verbal expressions 'here/there' or 'this/that', or a non-verbal nod used to refer to a position. Finally, Experiment four examines the participants' comprehension of those deictic verbs that involve a movement towards or from the speaker's position, like come/go and bring/take.

Chapter 6 will examine aspects of role-taking that are embedded in non-verbal communication between two people. When conversing with another person, several aspects of the other person's point of view are taken into consideration, not only through language, but also through non-verbal expressions. For example, we normally make shakes and nods of the head to link in with what is being said by another person, as well as to let the other person know that we are listening. However, individuals with autism have been reported to have limitations in the non-verbal expressions that they use in conversations. For example, they have been reported to use fewer head shakes and nods, and fewer interpersonal looks than language matched control groups in conversations with another person, especially when the other person is speaking (Tantam *et al.* 1993; Capps *et al.* 1999). One of the aims of the study presented in this chapter was to replicate these previous findings, by comparing the non-verbal exchanges of groups of matched participants with and without autism in the context of an interview. Participants with autism were predicted to show abnormalities in their use of non-verbal expression, because of their relative lack of identification with other people. Further, a novel approach was included in this study, where it was predicted that the relative lack of mutual identification would be reflected in the

interviewer's non-verbal expressions. The non-verbal measures included head shakes and nods, looks to the other, and smiles. These measures will be examined in relation to the periods of time when either the participant or the interviewer was talking. Innovative subjective measures of social connectedness were also included in this study in order to examine the relation between interpersonal engagement and the non-verbal expressions used by the participants.

The final chapter will be devoted to a review of the above studies, a discussion of their significance in relation to previous clinical and experimental investigations, and a consideration of methodological issues.

Therefore this series of studies will investigate three aspects of role-taking: a) the ability to adopt the role of a character, b) the use and understanding of deictic person-anchored expressions, and c) the use of interpersonal non-verbal communication. The results of these studies will shed some light about the nature of the role-taking deficits in people with autism and will provide new evidence about aspects of role-taking that are both impaired and intact in these individuals. The understanding of these aspects will be crucial to identify the processes underpinning the human capacity for simultaneously considering multiple perspectives. The studies will generate evidence for or against the hypothesis that basic non-inferential role-taking processes related to the way we identify with the attitudes and feelings of other people, are relatively lacking in individuals with autism.

CHAPTER TWO

Role-taking, issues in Autism

2.1 Introduction

Autism is a disorder that has fascinated scientists since it was first described by Kanner in 1943. One source of fascination is the difficulty that individuals with autism have in understanding other people, but perhaps equally fundamental for our understanding of autism is the experience of parents and professionals who feel unable to establish a full emotional connection with a person suffering from autism.

Chapter 1 was concerned with how young infants come to understand that other people have psychological perspectives different from their own. Two kinds of role-taking were distinguished, conceptual and non-inferential role-taking. The processes involved in the development of both types of role-taking were examined through two main theories, the theory of mind and the interpersonal theory. The hypothesis of the present thesis is founded on the interpersonal theory. This suggests that early social connectedness with other people, a non-inferential type of role-taking, is the mechanism that drives infants to feel moved by other people and to gradually become aware of the thoughts and feelings of others in a conceptual form of role-taking. Finally, the case of autism was introduced by emphasizing these individuals' difficulty not only in understanding the mental states of other people, but also in being involved with other people through feelings.

The first aim of this chapter is to introduce the syndrome of autism, and to clarify the main features of the syndrome. I shall stress clinical evidence for a lack of social connectedness in individuals with autism. Those individuals' limitations in both non-inferential and conceptual forms of role-taking will be considered with reference to the view that an early impairment in

interpersonal engagement with others might account for later limitations in the ability to think about the minds and perspectives of others.

2.2 What is autism?

2.2.1- Description of Autism

Autism has been characterized in different ways by clinicians and researchers, as well as by affected individuals (Kanner, 1943; Asperger, 1944; World Health Organisation, 1987; Frith, 1991; American Psychiatric Association, 1994; Rivière and Nuñez, 1996; Williams, 1996). One of the difficulties in describing the syndrome is that it may present differently in different individuals. Some people with autism are more '*aloof*', some more '*active but odd*' and some are more '*passive*' (Wing & Gould, 1979). Another difficulty is that autism is a *developmental disorder* whose features change through the life of the child. One challenge is to define which aspects of the child's abnormal social development are specific to autism and which others are not. For instance, mental retardation can affect the social development of the child, but the clinical features may be distinguished from those that characterize autism. Therefore, an in-depth description of autism requires an integration of different aspects of the syndrome.

In his first description of autism, Kanner (1943) considered that the 11 cases he was studying were examples of "*...inborn autistic disturbance of affective contact*" (p.250). Kanner identified as the fundamental characteristic "*...the children's inability to relate themselves in the ordinary way to other people*" (p.242). These difficulties in engaging with other people were reflected in

the descriptions given to him by parents who gave statements such as the following about these children:

'having always been 'self-sufficient'', 'like in a shell', 'happiest when left alone', 'acting as if people weren't there', 'perfectly oblivious to everything about him', 'giving the impression of silent wisdom', 'failing to develop the usual amount of social awareness' (p 242).

In these 11 cases, Kanner also described characteristics such as the children's failure to assume an anticipatory posture, excellent rote memory, delayed echolalia, refusal of food, reactions to loud noises and moving objects, anxiously obsessive desire for the maintenance of sameness, perturbation upon the sight of anything broken or incomplete, limited spontaneous activity, experiencing of people in about the same manner as objects, their good cognitive potentialities, physically normality, and the fact that they were often raised in highly intelligent families.

People who suffer from autism have also highlighted the lack of social connectedness with other people. In Donna Williams's (1996) statement of how she has experienced this syndrome, she makes explicit her difficulty in building up a sense of self and understanding other people. She describes how she had to learn to act and the difficulties that she experienced to differentiate her own self from other selves. She wrote:

"... I learned to act as though I had a sense of 'us' and 'we' even if my systems integration problems made it very difficult to consistently process internal 'self' and external 'other' at the same time" ... "My 'autism'-related difficulties ... drowned out any remaining residue of REAL interests or wants, thoughts or emotions and made me an accomplice to the actions and expressions of a body, face and voice I didn't even feel was mine. (p. 5)

According to Williams, non-autistic people can 'read appearances', and her difficulties in understanding other people has led her to see 'systems' rather than 'appearances'. On closer inspection, this difficulty in 'reading of appearances' appears to reflect an impairment in basic forms of non-inferential role-taking.

2.2.2- Clinical case and features of autism.

One of the 11 cases that Kanner included in his first report was that of Charles N, who was brought to his clinic by his mother on February 2, 1943, aged four years and five months. He was born normally and was a planned and wanted child. He sat up at 6 months and walked at less than 15 months with no preliminary creeping. Charles was the oldest of three children. His father was a high school graduate and a clothing merchant. His mother had a successful business in New York. Kanner described the first time Charles entered his office with the following:

"Charles was a well developed, intelligent-looking boy ... When he entered the office, he paid not the slightest attention to the people present. Without looking at anyone, he said, 'Give me a pencil' and took a piece of paper from the desk and wrote something ... He had brought with him a copy of 'Readers Digest' and was fascinated by a picture of a baby. He said, "Look at the funny baby," innumerable times, occasionally adding, "Is he not funny? Is he not sweet? ". (p.236)

Charles's mother described Charles as an inactive baby, "...slow and phlegmatic" "he would lie in the crib, just staring" (p.235). The lack of social connectedness was also emphasized by Charles's mother: "The thing that upsets me the most is that I can't reach my baby" (p.235). She also used expressions such as 'detachment', 'inaccessibility', 'lives in a world of his own' (p.236), which reflect the psychological and emotional inaccessibility of Charles. She also said the following about Charles's difficulties in relating to other people,

" No sense of relationship to persons.... he never envelops himself in a group...never offers anything himself...he never initiates conversation". (p.236)

Kanner reported that the lack of social connectedness was also noticeable in Charles's eye contact:

"When he is with other people, he doesn't look up at them ... He did not pay attention to them, but their presence was felt. He will mimic a voice ... He did not respond to being called and did not look at his mother when she spoke to him". (p.236-7)

Another characteristic of Charles' lack of social connectedness was reflected in his absence of awareness of other people's psychological perspectives, even though, as Charles's mother pointed out, he registered the presence of the people who were in the room. This difficulty in attributing a mind to a person was clearly present in the first encounter that Kanner had with Charles, and is an important feature of the autistic syndrome:

"... he struggled with the hand that held it, without looking at the person who had taken the book ... at no time did he seem to connect the pricking with the person who held the pin ... he tried to remove the foot as if it were another detached and interfering object, again with no concern for the person to whom the foot belonged". (p.237)

Despite Charles' isolation and incapacity to relate to people, he developed impressive cognitive abilities. At the age of eighteen months, he could discriminate between eighteen symphonies and he had a wonderful memory for words. Charles' mother also reported that he had developed obsessions and an inflexible pattern of behaviour. For instance, he was interested in reflecting light from mirrors and catching reflections.

One more feature of autism that was apparent in the case of Charles was his abnormal use of language, and in particular, shifting among the uses of person-anchored terms:

"He would say, 'he wants' –never 'I want ... he once turned to his mother and excitedly said, 'Give it to you!' ...He never used language as a means of communicating with people". (p. 236-7)

The case of Charles exemplifies not only the main characteristics of the autistic syndrome, but also the difficulties that these individuals have in understanding other people. They appear to have an incapacity to connect emotionally and psychologically with others.

2.3 Theories related to role-taking in autism.

There are several theories that have tried to explain the difficulties that people with autism have in understanding that people have different psychological perspectives. Some of these theories have focused more than others on role taking difficulties to explain the picture of autism. Two of the main theories of autism that have given special precedence to role taking are the interpersonal theory and the theory of mind theory. It is for this reason that I will mainly focus on these two theories throughout this thesis. However, I would like to describe briefly two other influential theories, the 'Weak Central Coherence' theory and the 'Executive Function' theory, that might also explain why individuals with autism have role taking difficulties.

2.3.1- A summary of theoretical perspectives

Building on collaborative work with Hermelin, Frith (1989, 1991) suggested that people with autism have specific difficulties in integrating different aspects of situations because they have a 'weak central coherence'. Central coherence is the ability to process the information that we receive in wholes, rather than in parts. For example, when we read, the essential part of a story, as oppose to the details, is often most easily remembered by non-autistic individuals. According to this theory, people with autism have fragmented information processing, tending to focus more on parts and local details rather than on coherent whole configurations. This type of processing has been described as a certain kind of cognitive style (Happé, 2001) that explains both intellectual strengths and weaknesses of these individuals. For example, in the block design subtest of the Wechsler scales, people with autism tend to perform better than non-autistic individuals in reconstructing from separate blocks a model pattern that appears as a total

configuration. When, however, the model design is shown in 'pre-segmented' form, the advantage of those with autism disappear (Shah and Frith, 1993).

Although proponents of this theory consider the ability to read the minds of other people as an independent ability from the weak central coherence ability, with both abilities in separate module systems which interact with each other, it remains possible to interpret certain features of role-taking in terms of an inability to integrate context or multiple sources of input. This would offer an alternative explanation for perspective-taking impairments in individuals with autism. However, it would not necessarily lessen the developmental implication of role-taking difficulties per se.

Another theory that might explain some aspects of the role taking difficulties found in people with autism is the Executive Functioning Theory. This is a neuro-cognitive model of dysfunction and views the impairment in executive functioning as primary. Executive functioning is defined as the ability to maintain an appropriate problem-solving set for the attainment of a future goal, involving such attitudes as planning ahead, inhibition of established responses, and flexibility in thinking and actions.

People with autism often appear to have difficulties in planning ahead, and inhibiting established responses, and tend to be rigid and inflexible, and perseverative. This is illustrated by performance on the Tower of Hanoi and The Wisconsin card Sorting Task. The former task can be completed only if one understands certain rules (for example, a larger disc cannot be placed above a smaller one) and plans ahead in order to complete the task. The latter task requires that one arranges cards according to feedback received, and measures the capacity for flexible thought through the ability to switch sorting strategies according to feedback. Ozonoff, Pennington and Rogers (1991) reported that children with autism obtained significantly lower scores than control

participants matched on chronological age and aspects of verbal IQ (the Information, Similarities and Vocabulary subtests of the WISC-R and WAIS-R) on both tasks. However, recent evidence presents a challenge to the theory that executive function difficulties give rise to the syndrome of autism. For example, evidence has emerged that executive function deficits emerge after affected children reach the age of three years (Griffith, Pennington, Wehner, & Rogers, 1999; Rutherford & Rogers, 2003; Wehner & Rogers, 1994), substantially after their abnormalities in social interaction and communication have been manifest.

It is possible to see how skills such as planning, anticipation, inhibition of pre-potent responses, and flexible shifting among mental schemata, might influence our interpersonal functioning, and through this, affect a range of role-taking abilities. However, these mechanisms of such effects are yet to be determined. Therefore, it seems appropriate at this stage to focus on both, the 'Interpersonal' theory and the 'Theory of Mind' theory to illustrate the role-taking impairment in autism.

According to the 'Interpersonal' theory, individuals with autism have an early impairment in social connectedness with other people that also involves an impairment in non-inferential role-taking. What this theory suggests is that there may be something in the way in which infants who will be later diagnosed with autism, respond to and perceive other people through feelings. It suggests that an inability to engage with other people from early in time prevents individuals with autism from fully developing an understanding of self and others as centres of consciousness, and therefore they have difficulties in understanding other people's minds.

In the previous chapter it was described how, in typically developing infants, the process of identification underlies person-person-object interchanges, with a '*relatedness triangle*'. This triangle exemplified the processes underlying joint attentional situations, where adult and infant

co-ordinate jointly their attention toward one aspect of the world. In these situations, the infant relates to *other people's psychological relatedness to themselves and to the world* (Hobson, 1993, p197). According to this theory, this type of interpersonal relatedness is abnormal in individuals with autism. First, they have difficulties in experiencing the adult's attitudes toward themselves and toward an object or event of the world. They lack the role-taking process of 'moving' to the stance of another person with feeling and experiencing aspects of the world through the 'emotional viewpoint' of another person (a process called 'identification'). Second, this lack of repeated experiences of the attitudes and feelings of other people in relation to the world prevents individuals with autism from fully developing a sense of separateness between their own perspectives and the perspectives of other people. This theory, therefore, suggests that non-inferential role-taking is the core of the autistic impairment in understanding other minds.

In contrast, the supporters of the 'theory of mind' theory have suggested that individuals with autism have impairment in conceptual role-taking due to an impairment in the cognitive (and modular) mechanism of metarepresentation (Leslie, 1987). This might stem from an earlier (and arguably, metarepresentational) impairment in the ability to use joint attention to show things (e.g. pointing to show a bird flying), an ability that contrasts with the ability to request (e.g. pointing to request a sweet). According to this theory, this impairment has an impact on the development of the child's symbolic activity and on the development of concepts about the mind of others, and more specifically on the development of concepts such as belief and pretend. Therefore the child with autism is unable to fully develop a 'theory of mind' about other people's minds and as a result of this, the child has difficulties in understanding the perspectives of other people.

The two theories presented above disagree in their view about which is the primary impairment that leads individuals with autism to have role-taking difficulties in understanding the

psychological perspectives of other people. Whereas the theory of mind theory considers the cognitive mechanism of metarepresentation the main cause of the theory of mind impairment in autism, the interpersonal theory suggests that certain aspects of non-inferential role-taking, more in particular the process of identification, are impaired in individuals with autism, and this is what leads them to have difficulties in conceptual role-taking.

I shall now consider some of the evidence for such ‘basic’ limitations in social connectedness and conceptual role-taking. Once again, I shall be considering the earliest forms of interpersonal relations – relations that are not obviously ones that involve ‘role-taking’ – for the reason that we may find evidence of developmental continuities between such relations and later, more explicit forms of interpersonal perspective-taking.

2.4 Impairments in social connectedness

The interpersonal theory posits that people with autism have an early impairment in non-inferential role-taking, that is to say, they have difficulties in linking in with other people and in ‘moving’ to the position of others through feelings and attitudes. According to this theory, infants who will be later diagnosed with autism do not connect with others in the same way as non-autistic infants. In the first chapter of this thesis, the way typically developing infants relate with others through primary (person-person interaction) and secondary (person-person-object interaction) mechanisms was described. Non-inferential role-taking was considered as a possible mechanism that underlies both processes. Whereas many people agree that secondary intersubjectivity involves a degree of non-inferential role-taking, it is questionable whether primary intersubjectivity mechanisms require the same degree of role-taking. I shall nevertheless

examine both types of mechanisms for possible manifestations of non-inferential role-taking impairment in individuals with autism.

2.4.1- Primary intersubjectivity

If individuals with autism have impairment in non-inferential role-taking, it is appropriate to explore whether this might be manifest in the ways in which they relate to other people during the first months of life. It has been difficult to explore the possible early manifestations of this impairment. I shall begin by considering studies of videotapes of infants who later attract the diagnosis of childhood autism, and come to consider evidence both from observational studies, and retrospective parental reports.

I begin with a study of videotapes carried out by Adrien *et al.* (1992). These authors reported disorders in a group of eight children with autism and three children with atypical pervasive developmental disorder as early as the fifth month of life. The participants' global development quotients (calculated with the Brunet-Lezina scale) varied from below 20 to 105. Family home movies were collected from the families, and 10 were made before any pathology was envisioned. In two cases movies were recorded at birth, and in five cases as early as the first two weeks of life. The films lasted between 10 and 80 minutes. The films were observed and evaluated by a group of professionals who were not blind to the diagnosis of the participants. Each film was scored with the Infant Behavior Summarized Evaluation (IBSE) Scale. The IBSE includes 33 items under six headings: socialization, communication, adaptation to the environment situations, tactility-tone-motility, emotional and instinctual reactions, and attention-perception. The following characteristics were detected during the first year: 1) poor social interaction, 2) no or abnormal eye contact, 3) no social smile, 4) lack of appropriate facial expressions, 5) lack of appropriate gestures and/or expressive postures, 6) too calm, 7) hypoactivity, 8) overly excited, 9)

hypotonia, 10) no expression of emotion, 11) ignoring people. A subsequent phase of the study compared three typically developing children with the three children with atypical pervasive developmental disorder and with six of the eight autistic children. The contents of the family home movies of the typically developing children were identical to the ones of the other children regarding age and the type of situations in which they were taken. The same scoring method was applied to these films. Results showed that signs of disorder were more marked and frequent in the group with autism than in the other two groups.

Another study that reported evidence of abnormal social connectedness before the age of 12 months, and more specifically between 9-12 months, was carried out by Baranek (1999). The age of the participants of the study was above 2 years and the families were required to have home videos of their child between birth and 2 years of age. The study group comprised 11 children with autism who had a mean age of 63 months, and a mild level of mental retardation. These participants were compared with 10 children with developmental disability and without autism of the same level of mental retardation and developmental maturity/adaptive behaviour, and with 11 typical developing children. The parents of the participants with autism and the participants with mental retardation reported onset of problems in their child prior to 18 months, but the group with autism evidenced these problems significantly later than the group with mental retardation. In addition, regression was reported by parents in 54% of the cases in the group with autism. An average of four scenes from the family videotapes was selected. The ages of the children in the films varied from 9 to 12-months of age, with a total 10 minutes of videotape per subject. From the tapes independent raters judged affective expressions, looks, gaze aversion, response to name, social touch responses, motor stereotypies, tactile modulation, auditory modulation and visual modulation. The proportion of time that each behaviour was observed was calculated. A series of one-way analyses of variance were performed on each variable. Results suggested that the children with autism needed more adult prompts to draw their attention when called than the

comparison groups, and they manifested a tendency to orientate less to visual stimuli, to manifest mouthing of objects and more aversion to social touch than the comparison groups. Interestingly, the children with developmental disability showed more stereotyped inappropriate play and less looking toward the camera than either of the other two groups. Unusual posture was significantly more frequent in the children with autism and developmental disability, relative to the typically developing children.

These two studies need to be considered critically, for methodological reasons. First, the size of the study and control groups was very small, making it difficult to extrapolate the results to the general population. Second, there was a lack of statistical analysis to support the results in Adrien's study. Baranek did not report distribution of results across participants, and therefore this makes the interpretation of the study difficult. Finally, there were methodological problems in relation to the kind and amount of videotape information used, and the way this information was rated. For example, although the investigators in both studies tried to ensure consistency in the videotaped films rated, this was only partly accomplished. Also, the raters of Adrien's study were not blind to either the participants' diagnosis or the aims of the study, and therefore ratings were likely to be contaminated.

It is here that one might turn to another source of evidence for early abnormalities in social connectedness, namely parental reports of behaviour in the early months of life. One study was carried out by Rivière (2000). The parental reports given by 83 families with children diagnosed with autism were compared to those given by 46 families with children with mental retardation and autistic-like features, and with those given by 66 families with children of the same age with normal development. The children with mental retardation and with autistic-like features had a mean developmental quotient and a mean chronological age comparable to that of children with autism (the means of the developmental quotients were 56 and 58 respectively, and means CA

were 6;7 and 6;3 years respectively). Results indicated that the two groups displayed a pattern of passivity or tranquillity, which attracted the attention of the parents during the first year. Moreover, there were three out of four parents of children with autism who perceived their children as 'normal' during the first year of life, versus one out of four parents of the children with mental retardation and autistic-like features. When the children with autism were compared with the typically developing children, the children with autism prompted greater suspicion of presenting an anomaly in development and were more 'quiet' or passive during the first year. This study suggests that the early social impairment of children with autism is less strikingly abnormal during the first year of life than that of children with mental retardation who also present autistic-like features.

However, after the first year of life the majority of studies – whether observational or of parent reports – provide evidence of a striking increase in the indicators of impairments in primary intersubjectivity in children with autism. For instance, Lösche (1990) reported that when playing with adults, children with autism appeared as “being played with” rather than playing with them. In Adrien's study (1992), the items "ignores people", "prefers to be alone", "poor social interaction", "no social smile", "lack of appropriate facial expressions", "lack of appropriate gestures and/or expressive postures", "unusual postures", "no expression of emotions" and "easily distracted" were specially noticeable after the first year. There is also evidence that after the children's first birthday, there are abnormalities in eye contact, for example as manifest in infrequent eye contact made with other people and the absence of following the gaze of others (Osterling and Dawson, 1994; Wimpory *et al*, 2000; Ozonoff and South, 2001; Leekam, and Moore, 2001), and other studies report a failure to orient to their names after the first year (Adrien *et al*. 1992; Riviere, 2000).

Here it may suffice to summarize two studies of impairments in primary intersubjectivity, each employing a semi-structured observational methodology. One is a study of children just past infancy, and the other concerns older children of similar age and ability to those tested in the present thesis.

Charman, *et al.* (1997) compared a group of 20-month-old children with autism with a group of children with developmental delay, and a group of typically developing children, in a situation where an experimenter pretended to hit his thumb with a toy hammer. For ten seconds, and before showing the child that his finger did not hurt anymore, he displayed facial expressions of distress and pain. The child's reaction to the experimenter's condition was videotaped. Not a single child with autism showed any facial concern, compared with 44% of the children with developmental delay and 68% of the typically developing children. Moreover, 60% of the children with autism did not look at the experimenter's face when sharing his distress, whereas this was the case for all of the participants in the other two groups.

In a quite different setting, Hobson and Lee (1998) videotaped 24 individuals with autism aged between 8.3 and 21.1 years (Mean verbal MA: 5;7) while greeting and saying farewell to a stranger experimenter (E2). The participants were matched with 24 mentally retarded non-autistic participants for chronological age and verbal mental age. The spontaneous responses to E2 (who was seated across a table) of the participants arriving and leaving a room with a familiar experimenter (E1) were coded, as well as the prompted responses when arriving at the room (i.e. if the participants did not spontaneously greet E2, then E2 said "*Hello, P (name)*"), and when leaving the room (i.e. if the participant did not make spontaneous gestures of farewell, E2 said: "*Goodbye*"). The coding procedure included both behaviour ratings (i.e. verbalizations directed to E1, looks at E2's face, wave at E2), and subjective ratings of the degree to which the participants were engaged with E2 (i.e. "*to what degree did you feel that P engaged with E2?*")

either, *strongly*, *somewhat*, or *hardly, if at all*). In addition, those participants who waved at E2 were examined for possible oddities in the way the wave was displayed. Results showed that individuals with autism were less likely to greet E2 spontaneously. The majority of participants in the two groups who required a prompt, made a response by saying something or by nodding. However, significantly fewer participants with autism looked to the experimenter's face. This lack of social engagement with the experimenter in the greeting period was also reported by rater's subjective judgement, in that the majority of the participants with autism (as oppose to a minority of the non-autistic participants) were felt to have engaged with the adult *hardly if at all*. Similar results were found when subjects took their departure. During this period, participants with autism were less likely than the control participants to use a wave. Moreover, the waves of all the participants with autism who waved were considered abnormal, compared with the 35% of the waves of the non-autistic participants who waved. The authors interpreted these findings in terms of a relative lack of intersubjective engagement by individuals with autism.

Therefore in both young and older individuals with autism, there are clinical features that appear to constitute impairments in primary intersubjectivity. The mechanism underlying such impairment has been suggested by some authors to involve deficits in non-inferential role-taking. Yet the studies that have examined children with autism during the first year of life – those that arguably, are most important for establishing whether impairments in non-inferential role-taking may be primary in autism - need to be reviewed carefully for several reasons. Firstly, these studies reveal that although some suggestive abnormalities in primary intersubjectivity could be found at very early stages in children with autism, most of these characteristics are not strikingly different from those seen in infants with mental retardation, and only appear to be clearly abnormal after the first year of life. Secondly, most of these studies present methodological problems, such as a lack of control of the impact of mental retardation on the development of the children, and the use of small numbers in the comparison groups. They do, nevertheless, provide

some information about the manifestations of a possible impairment in non-inferential role-taking during the first months of life of the child with autism. However, evidence of a limited ability to 'move' to the perspective of other people is more apparent after the first year of life.

2.4.2- Secondary intersubjectivity

Chapter 1 described how at the end of the first year of life, the ways infants engage with adults change markedly, in that they begin to engage in 'social referencing' towards adults when they do not know what to do in uncertain situation, and they become engaged in joint attention episodes, which they sometimes initiate (e.g. an infant shows a flower while alternating looks between the flower and the adult) or sometimes follow the attention-directing gestures of others (e.g. an adult points to a dog while alternating gaze between the dog and the infant).

Both the interpersonal theory and the 'theory of mind' theory predict abnormalities in such manifestations of secondary intersubjectivity in individuals with autism, but for different reasons. The first theory explains these abnormalities in terms of difficulties in engaging with other people and the latter theory explains it in terms of a more profound cognitive impairment that is a precursor of the development of a theory of mind.

One study that illustrates abnormalities present early in life is that by Baron-Cohen *et al.* (1992). These investigators asked general practitioners and health visitors to administer a screening instrument for autism (the Checklist for Autism in Toddlers, CHAT) to 41 eighteen-month-old siblings of children already diagnosed with autism, as well as 50 randomly selected 18-month-olds in their developmental check-up. Four of the 41 siblings of children with autism failed two or more of the items related to joint attention behaviour (e.g. "*Does your child ever bring objects over to you, to SHOW you something?*"), 'sharing' or 'protodeclarative' pointing (e.g. "*Does you*

child ever use his/her finger to point, to indicate INTEREST in something?"), as well as items concerning pretend play, social interest and social play. These were the only children who received a diagnosis of autism at the age of 30 months.

In a subsequent study, Baron-Cohen *et al.* (1996), asked general practitioners and health visitors to pass the same check list to 16000 children, once again, during their 18-month-old developmental check-up. From the previous study, they predicted that children at 18 months of age who failed three items ('protodeclarative pointing', 'gaze-monitoring', and 'pretend play') would be at risk for receiving a diagnosis of autism. They found 12 children who consistently failed the three key items. Diagnosis of autism was confirmed in 10 of these children at the age of three years and six months of age.

Such evidence is complemented by retrospective reports by parents of children with autism. Wimpory, Hobson & Nash (2000) explored the manifestations of social engagement during the first two years of age in a group of young children with autism using a semi-structured interview (The Detection of Autism by Infant Sociability Interview) given to parents. The participants included 10 children with autism and 10 non-autistic developmental delay participants of comparable age (between 2.5 and 4 year-olds) and developmental level (Griffiths Performance Quotient between 23 and 117) at the time of the parental interview. Some of the items of the interview referred to joint attention skills, for example, 'showing', 'offering', 'giving', 'referential eye contact', 'pointing' and 'following points' (e.g. "*Would s/he show you things*", or, "*Would s/he look both to where s/he was pointing and to you?*"). Results showed that the parents of the children with autism were most likely to report that their children very infrequently offered or gave objects to others, pointed at objects or followed others pointing at objects. The authors concluded that infants with autism manifest a range of abnormalities suggesting a profound limitation in 'triadic' person-person-object interactions. The authors suggested that

autism-specific deficits in joint attention and other aspects of triadic interaction may arise from developmentally prior abnormalities in the children's ability to establish and experience 'primary intersubjectivity' with others. These authors, therefore, link the limitation of individuals with autism in primary intersubjectivity with their later limitation in secondary intersubjectivity.

So, too, there is evidence from semi-structured observations of somewhat older children. Mundy *et al.* (1994) examined whether joint attention is a specific impairment in autism or is an impairment that is related to high/low mental age. Thirty young children with autism were divided into a 'low mental age' group (Mean CA: 3 years, and Mean MA: 18 months) that comprised 13 children, and a 'high mental age' group (Mean CA: 4 years, and Mean MA: 30 months) with the remaining 17 participants. These two subgroups were matched for chronological age and mental age with a mentally retarded group, and for chronological age with a typically developing group of children. The participants were systematically presented with various toys, with situations designed to elicit non-verbal responses. For example, in some situations the experimenter pointed to the left, the right and behind while saying the child's name, or provided the child with the opportunity to roll a ball back and forth, and to take turns using different objects, like a hat. The scoring procedure distinguished '*low level joint attention behaviour*', which included incidents of either eye contact while holding a toy, or alternating eye gaze between the experimenter's face and the toy, from '*high level joint attention behaviour*', which included either pointing to toys within reach, or showing or extending toys towards the experimenter's face. Results showed that in the low mental age sub-groups, significantly fewer participants with autism than participants from the other two groups followed the experimenter's pointing. However, no significant differences were found among the high mental age subgroup with autism and the other two groups in this respect, with a majority of participants in the three groups following the experimenter's point. In relation to the 'high' and 'low' levels of joint attention behaviour, the participants with autism, compared with the other two groups, exhibited significantly less 'low' and 'high' levels of joint attention behaviour. Moreover, the higher mental

age sub-groups showed significantly more 'low' and 'high' level of joint attention behaviour than the lower mental age subgroups. Among the 'low' mental age subgroups, the participants with autism exhibited significantly less 'low' level of joint attention behaviour than the other two groups, and significantly less 'high' level joint attention behaviour than the typically developing participants only. Among the high mental age sub-groups, no significant differences were found in the 'low' level of joint attention behaviour, although significant differences were found for 'high' level of joint attention behaviour with the developmentally delayed group only. The results of this study suggest that in non-autistic children, the development of social abilities, like for example joint attention, is related to mental age. However, in children with autism, only those with high mental ages appear to achieve some significant, although limited, joint attention understanding, which suggests that children with autism follow different pathways in the development of their social capacities.

As in the case of primary intersubjectivity, it is possible to trace later manifestations of impairments in secondary intersubjectivity later in the children's lives. For example, drawing on other authors Bates *et al.* (1975) and Baron-Cohen (1989) distinguished two types of pointing: protoimperative and protodeclarative pointing. Protoimperative pointing is that employed to use another person to obtain an object (e.g. Infant points to obtain a sweet), whereas protodeclarative pointing is used to comment on something about the world to another person (e.g. Infant points to show a colourful butterfly). The aim of Baron-Cohen's study was to explore in more detail the suggestion that requesting gestures (protoimperatives) are present in individuals with autism, whereas those gestures that are used to share an event of the world (protodeclaratives) are absent in children with autism. Twenty children with autism (Mean CA: 11;11, Nonverbal MA: 9;3, Verbal MA: 5;5) were compared with 14 children with Down Syndrome of lower non-verbal and verbal mental ages (Mean CA: 10;11, Nonverbal MA: 5;11, Verbal MA: 2;11), and with twenty seven 4-5 year-old typically developing children. To test whether the child could label a pointing

as either a requesting or a 'sharing' gesture, the participants were instructed: "*I am going to use my finger to say something. What am I saying?*". In order to test comprehension of protoimperative pointing, the experimenter, while facing the participant, pointed to one of four toys in turn. The toys were positioned close to the participant but at some distance from the experimenter. In order to test comprehension of 'sharing' pointing the experimenter walked over to the window, looked up to the sky and pointed while alternating gaze between the child and his object of reference. The results of this study showed that in the protoimperative pointing task, the majority of participants in the three groups interpreted the point as a request for objects (14/20 autistic, 11/14 Down Syndrome and 25/27 typically developing participants); whereas in the protodeclarative pointing task, significantly fewer participants with autism (2/20 participants) than participants in the other two groups (12/14 Down Syndrome participants and 26/27 typically developing participants) passed the task by indicating their understanding of the gesture.

In a subsequent experiment, Baron-Cohen tested the use of pointing in a group of 10 children with autism, 10 children with mental retardation and 10 two year-old typically developing children. The groups with autism and with mental retardation were comparable in their CA (means: 3.9 and 4.2 respectively), non-verbal MA (means: 3.0 and 2.0 respectively) and verbal MA (means: 1.9 and 1.6 respectively). Each group was video-taped for 45 minutes during play. Results showed that whereas a non significant difference was found in the use of protoimperative pointing among the three groups (4 in the group with autism, 8 in the Down Syndrome group and 7 in the typically developing group), not a single participant with autism, compared with 7 Down Syndrome and 9 typically developing children, used pointing to share (i.e. protodeclarative pointing). Once again, the results of this study support the prediction that individuals with autism are impaired in the production of 'sharing' pointing, whilst their production of 'requesting' pointing is relatively unimpaired. 'Sharing' pointing involves taking into account the perspective

of the other in relation to an aspect of the world, an ability that appears to be impaired in individuals with autism.

To summarize, individuals with autism seem to have specific deficits in person-person-person interactions from early in their lives, and in particular, they have profound deficits in joint attention situations that involve sharing an event with another person, as opposed to joint attention situations that involve requesting objects. Since sharing of experiences involves some level of understanding that another person has a distinct subjective orientation, one might view these deficits as expressions of impairment in early forms of role-taking.

2.4.3- Autism and the process of identification

Finally, there arises the question of what are the mechanisms of supposed 'non-inferential role-taking' that might have roots in primary as well as secondary intersubjectivity. Here a study not with infants, but with older children and adolescents with autism, may point to the kind of processes that are involved.

Hobson and Lee (1999) tested the hypothesis that *"people with autism might have specific limitation in imitating the 'style' of another person's actions, and identifying with another person in tests of imitation"* (p.649). The aim of their experiment was to examine whether or not individuals with autism can imitate not only the action that accomplishes a goal, but also the style with which the action is performed. The imitation of the style was considered an index of identification with the person who performs the action. Sixteen participants with autism were matched according to chronological age and mental ability with 16 non-autistic mentally retarded participants. First, the investigators checked that the participants did not spontaneously use the material in the same way as the experimenters were going to demonstrate. The participant was

seated across a table from the experimenter. During the demonstration period, the experimenter demonstrated four actions with different objects after saying “*Watch this*”. The actions were the following: a) E put a pipe-rack to his shoulder and drew the stick along its slotted edge three times, b) E wiped his brow with a cloth frog in three brief moments and then flattened the frog with a roller, c) E pressed a stamp on to the ink-pad and then on the a sheet of paper, and d) E pressed the top of a rolling policeman toy.

In addition, the experimenter employed two different styles of actions so that half of the children saw the experimenter using one style and the other half using the other style. In the first task, the experimenter strummed the pipe-rack in either a harsh or a gentle way. In the second task, the experimenter wiped his brow with the frog with either abrupt/harsh or with gentle/caressing movements. In the third task, the experimenter stamped down the inkpadd and then the paper in either a forceful or in a careful way. Finally, in the rolling-policeman task the experimenter used either two outstretched fingers, or the front of his cocked wrist, to depress the top of the policeman.

Nearly all the participants were attentive and motivated to accomplish the goals of the four actions. However, as predicted, the participants with autism were significantly less likely than the control participants to imitate the style that accompanied the action. The authors suggested that the control participants imitated the style as well the goal of the action because they imitated not only the action, but also the person who accomplished such action, whereas the participants with autism imitated only the action. In addition, the authors realized that two of the four demonstrated actions involved an orientation to the body of the person who was acting, as seen in the pipe-rack and the frog tasks. Results showed that whereas 10 control participants oriented the pipe-rack to their own body and 14 oriented the frog to their own brows, only two participants (of the 16) with

autism oriented the pipe-rack to their own body, and only five applied the frog to their own brows. Hobson (2002) gave the following interpretation of these results:

“In two respects, then, the children with autism were not moved to adopt the orientation of the person they were watching. They did not adopt the style with which Tony (the experimenter) executed the actions, nor did they identify with him and copy his self-orientated action so that these actions became oriented towards themselves. On the other hand, they were perfectly able to perceive and copy the strategies by which he achieved the goals in each demonstration. So they were able to learn something from watching what Tony did. They were also motivated to use what they had learned when their own turn came round. Yet what they learned seemed to be available from their position as a kind of detached observer of actions and goals. They were not moved.” (p.223)

To date, however, there is only this suggestive evidence that individuals with autism fail to identify with other people, and one aim of the present thesis is to explore this hypothesis from novel points of view.

2.4.4- Additional perspectives

There is one additional line of evidence that bears upon the thesis that an impairment perceiving and responding to the attitudes and feelings of other people, rather than a constitutional cognitive impairment, might lead to autism. This derives from recent studies of children who have been deprived of certain forms of social contact from early in life, and specifically, deprived of experience of the ‘relatedness triangle’ either because of lack of vision – since vision is important for seeing how other people’s attitudes focus on a ‘target’ in the world – or profound deprivation. The evidence comes from studies of congenitally blind children, and children raised in Romanian orphanages where social contact was very limited.

In the case of congenitally blind children, the suggestion is that a lack of visual experience can lead to failure in psychological perspective taking. Moreover, the ability to perceive and be drawn into the bodily expressed feelings and attitudes of other people may be crucial for the

development of mental representations of the child's self in relation to other people (Sandler & Hobson, 2001). Hobson has suggested that because congenital blind children lack the experience of seeing (literally) the attitudes of other people directed to the world, and the experience of the 'relatedness triangle' between the self, other and the shared environment, they are, therefore, *deprived of a principal means to achieve psychological co-orientation and co-reference with others* (Hobson, 1993, p. 205). To be able to move and shift flexibly among different perspectives is very important for the children's differentiation of different psychological orientations, and has been said to play an important role in the development of symbolism, language and theory of mind.

There have been several studies of congenitally blind children suggesting that an impairment in the perceptual ability to see are indeed associated with clinical features similar to those found in individuals with autism. For instance, Brown *et al.* (1997) found that in a group of special schools (and therefore not an epidemiological sample) a proportion of 10 out of 24 congenitally blind children justified the diagnosis of autism. This proportion corresponded closely with that suggested by Fraiberg and Adelson (1977), namely 7 out of 27 blind children. Brown *et al.* compared a group of visually impaired children who had been totally blind or with minimal light perception from birth, and a group of sighted autistic children. The two groups were subgrouped according to upper and lower ability in relation to their verbal IQ and were matched according to age and cognitive ability. In the upper ability category there were 15 blind children and 10 sighted children with autism. In the lower ability category there were 9 blind children and 9 sighted children with autism. The prevalence of autistic-like features distinguished more intellectually able ($IQ > 70$) blind children from group-matched sighted autistic children, whereas less able ($IQ < 70$) blind children were comparable to group-matched autistic children.

In a subsequent study, Hobson, Lee and Brown (1999) compared the same 9 visually impaired children who had been included within the lower ability group in 1997, with 9 sighted children with autism who were similar in age and intellectual ability. This time the groups were matched for IQ as well as verbal mental age. The purpose of this study was to examine the differences in the profiles of performance between visually impaired and sighted autistic children that might alter our perspective on the psychopathology of autism itself. The principal results were that there were close similarities between the groups, although there was some indication that the social impairments of the blind children were less severe than in those who were sighted.

In order to test the performance of a group of blind children in a theory of mind task, Minter, Hobson & Bishop (1998) compared a group of 21 visually impaired children with a group of 21 sighted children, matched by CA and verbal IQ. Then, the participants were given two different theory of mind tasks which had been adapted for use with blind children. The performance of the participants across the two tasks was that over half of the visually impaired children ($n=12$), and only two sighted children, failed at least one theory of mind question. Moreover, one third of the visually impaired children ($N=7$) but only one out of 21 sighted children failed at least two such questions. The authors concluded that the factor most likely to account for the differences observed between visually impaired and sighted children's performance on theory of mind tasks is the ability to see.

Here, then, there is evidence to suggest that for whatever reason – and plausibly but not necessarily, because of a lack of visual co-orientation with other people – congenitally blind children are at risk for the kinds of perspective-taking difficulties observed in sighted children with autism. Might such difficulties also arise in children who are deprived of almost all human contact over the early months of life? Here evidence from Romanian orphans may be relevant.

With the end of Ceaușescu's regime, several orphanages were found with children who had been raised in very extreme condition where contact with other people was minimal. For example, some children were left in their cots for days without toys or any other stimulation, with limited contact with other people when they needed to be fed or washed. Some of these children were adopted by families in the United Kingdom.

A group of 111 of these children who before the age of 24 months were adopted in the UK were studied by a group of researchers to examine the impact of extreme social deprivation on the development of these children (Rutter *et al.* 1999). Professionals assessed the children at the ages of four and six years. What the authors found is that a higher than expected proportion of these children developed features of autism. The prevalence of autism in the UK has been reported to be of 4.9 children in 10,000 (Wing and Gould, 1979), and of 21.2 when including those individuals within the spectrum of autism. In Rutter's study one in 16 children presented with features of autism. The children who presented features of autism were further observed and studied through systematic interviews with parents, and questionnaires to parents and teachers. Although the features of autism differed considerably among the children, all children had severe problems with social relationships and communication. For instance, they had difficulties in forming friendships, showed impoverished reciprocal communication with others, poor eye-to-eye gaze and gestures in social exchanges, and their language in conversations was limited. A majority of these children also developed obsessions and preoccupations, like many children with autism. The authors considered that prolonged experience of terrible social and non-social privation was very likely to be the main factor responsible of the "quasi-autistic" patterns found in these children. Once again, it appears that social-developmental factors, and perhaps but not necessarily experience of sharing experiences of the world with others, may lead to a clinical picture that includes features of autism and failures of role-taking.

2.4.5- Summary

There are some data to suggest that individuals with autism have impairments in their early interpersonal relations that amount to deficits in forms of non-inferential role-taking. Abnormalities in both primary and secondary intersubjectivity have been reported in these children. One hypothesis is that failures in 'identification', involving engagement with and 'movement towards' the psychological state of others, may be the underlying mechanism of such abnormalities.

During the first year of life, family home movies studies have revealed that babies who will be later diagnosed with autism present signs of anomalous development, are more 'quiet' or passive, manifest poor social interaction and manifest abnormal non-verbal gestures (e.g. eye contact or smiles) than typically developing children. However, when compared with children with mental retardation or developmental delay results are not decisive. The parents of the children with autism appear to report problems in their children significantly later than the parents of children with mental retardation or developmental delay. However, children with autism need more adult prompts to draw their attention when being called than children with developmental delay. In addition, regression (i.e. loss of capacities already acquired and used by the child) has been reported by 54% of parents of children with autism, and in this case, it is questionable how far one can claim that deficits in primary subjectivity or identification are 'primary' for other aspects of the syndrome. Observational studies of children with autism have provided evidence of a lack of emotional responsiveness to others during the second year of life, but by this time, it is also plausible that cognitive impairments such as those related to 'metarepresentation' may be operative.

Impairment in person-person-object interactions, Trevarthen's secondary intersubjectivity, has also been reported. Individuals with autism appear to have impairment in joint attention. For example, children with autism have difficulties in understanding and producing gestures that are used to share an event (as oppose to request for something). The lack of 'sharing' gestures, like pointing, have been considered as possible precursors of the autistic impairment in conceptual role-taking, and its absence in young infants has been recently included as a risk factor for the diagnosis of autism.

The interpersonal theory suggests that the process underlying non-inferential role-taking is the process of identification. Individuals with autism have been suggested to have difficulties in engaging emotionally and psychologically with other people, in other words, they have difficulties in identifying with other people with feelings and attitudes. For example, individuals with autism do not spontaneously say something or nod when greeting or saying goodbye to a stranger, and show limited eye contact with the new person. Moreover, the gestures of those who use a wave to say goodbye, appear to be abnormal. Also, the lack of identification with other people has been suggested to explain why individuals with autism can imitate and accomplish the goal of an action displayed by another person, but have specific difficulties in imitating the style used by that person while performing the action (e.g. gentle vs. harsh). Moreover, even though individuals with autism are motivated to imitate the actions and the goals of the actions that are orientated to the body of the person that performs them, they do not orientate these actions to their own bodies. This lack of orientation when imitating another person's actions has been suggested to be an indicator of the lack of identification with other people of individuals with autism. Therefore, although they can imitate the action, they do not appear to imitate the person that accomplishes the action.

Finally, studies that examine children who have experienced specific kinds of deprivation of interpersonal contact from early in life, and in particular congenitally blind children or children raised in Rumanian orphanages, provide some evidence to suggest that such conditions can lead to a picture similar to that characterized by individuals with autism. Therefore it is plausible that impairments in non-inferential role-taking play a role in leading to the syndrome of autism.

2.5- Conceptual role-taking in autism

The majority of studies that have examined the 'Theory of Mind' impairment in autism have focused on the understanding of certain mental states, for example what it means to have false beliefs. The importance of 'false belief' is that it is a mental state in which a person has a representation of a state of affairs that is false, and therefore does not correspond to 'true' reality (Perner 1991); and someone who understands this, understands the nature of people's mental representation as constructs of 'reality'. From the point of view of role-taking, here we have an example of the kinds of concepts required to fully appreciate how other people's perspectives differ from one's own, and how 'perspectives' *per se* are of different kinds.

Baron-Cohen *et al.* (1985) showed a group of children with autism, a group of children with Down syndrome and a group of typically developing children two dolls, one called Sally and one called Anne, who were standing in the same room. The participants with autism had a mean mental age of 9,3 years, whereas the other two groups had lower mean mental ages of 5,11 and 4,6 years respectively. The participants were shown how Sally placed a marble in a basket and went out of the room. While Sally was out, Anne moved the marble to a second basket and then Sally came back in. First, the authors ensured that the participants knew the dolls' names. The participants were then asked different questions to test whether they knew that Sally would look

for her marble in the basket that she (mistakenly) thought the marble was (belief question), and whether they knew where the marble was in the beginning and where the marble really was at the end (memory control question and reality control question). Even though the mental ages of the group with autism were higher than the ones of the other two groups, eighty percent of the children with autism failed to appreciate Sally's false belief, saying that Sally would look in the basket where the marble actually was. In contrast, 86 percent of children with Down syndrome and 85 percent of the typically developing children responded that Sally would look where she had previously placed the marble. All participants successfully passed the remaining questions. Baron-Cohen et al. concluded that children with autism have a specific impairment in understanding other people's mental states, and more specifically, the mental state of belief.

Since this study was published, several studies have explored why individuals with autism have difficulties in understanding the mental state of 'belief' and whether this impairment is specific to this term or is related to a wider impairment in understanding other mental states. For example, Perner *et al.* (1989) devised a task with a smarties container. The participants with autism had a verbal mental age between five and 13 years. In this task the children were presented a smarties container and were asked what they thought was inside the container. They were then shown that there was a pencil instead of smarties and were asked what the next child would think is inside the smarties container. As in the previous task, the aim was to test whether the participants understood that the next child would not know that there was a pencil inside the container, and therefore would think that there were smarties inside the container instead. Once again, results showed that children with autism failed to recognize that another person might have a false belief about what was inside the smarties container, even when the participants with autism had been compared with a group of children with specific language impairment of lower verbal mental ages.

The impairment of individuals with autism in understanding 'false belief' or related mental states was also confirmed using a different kind of task, a picture-sequencing test (Baron-Cohen et al., 1986). Individuals with autism performed well at sequencing stories that did not involve any understanding of mental states, whereas they performed significantly less well than typically developing participants or matched Down syndrome participants in those stories that involved understanding of a person's belief. Other studies with older children with autism have provided further evidence of this impairment (e.g. Baron-Cohen, 1989b; Reed and Peterson, 1990; Ozonoff, *et al.* 1991).

Additional studies have examined whether individuals with autism have difficulties in understanding other mental states than belief. One way of thinking about such studies is in terms of the kinds of mental perspective – or the kinds of role-taking – that either prove difficult, or relatively possible, for individuals with autism.

For example, Leslie and Frith (1988) tested two aspects of cognitive understanding in children with autism. First, they tested the ability to predict behaviour according to what someone knows or does not know. Second, they tested the ability to remember the location of an object and understanding of the concept seeing/not seeing. The participants consisted of 18 children with autism whose CA ranged from 7;01 to 18;06 years, and whose MA ranged from 4 years 5 months to 12 years 8 months; and 12 children with specific language impairment (SLI), whose CA ranged from 6 years 11 months to 9 years 11 months, and whose MA ranged from 5 years 5 months to 8 years 7 months. All the children were given a 'false belief' task. In addition, 14 of the children with autism participated in two other tasks (line of sight and memory for position), and all the 18 children with autism were also given a 'limited knowledge' task. The line of sight task was a visual perspective-taking task, where the children had to work out whether or not a doll could see a counter using different positions. The memory of position task tested the children's ability to

remember the box in which a marble had been placed by an experimenter. The limited knowledge task tested whether or not the children were able to know that another person may or may not know that an object had been hidden in a certain place depending on what that person had seen. Finally, the 'false belief' task was similar to the Sally/Anne task but in this case, two experimenters gave the task instead of using dolls. The children with autism were very successful in their performance in the line of sight and memory for position tasks. They, nevertheless, performed very poorly on the knowledge and false belief task, with 10 and 13 participants respectively failing in their responses. This study supports the notion that children with autism have specific difficulties understanding not only beliefs, but also knowledge.

Tan and Harris (1991), examined the understanding of mental terms of perception, emotion and desire in individuals with autism. They tested a group of 20 children with autism (Mean CA: 12;8, mean VMA: 7;7) who were compared with a group of 20 typically developing children (Mean CA: 6;11, Mean MVA: 6;5). The participants were given a visual perspective-taking task based on Flavell's distinction of two levels of perspective-taking ability (levels one and two). Results indicated that children in both groups were very accurate on both levels of perspective taking ability (a result that confirmed previous studies about visual-perspective taking in autism; Hobson, 1984). Then, the children's understanding of simple emotions and desires was tested. In this case, a group of 22 children with autism (Mean CA: 12;1, Mean VMA: 6;3), was compared with a group of 22 typically developing children (Mean CA: 6;2, Mean VMA: 6;4) and a group of 22 mentally retarded children (Mean CA: 12;1, Mean VMA: 6;3). The procedure began with an 'emotion judgment' task, where the participants were asked whether they would feel 'very happy' or 'so unhappy' in four different scenarios. At the end of this task the participants were offered the choice of a sweet, with the promise that it would be given to them when they had finished. Then a 'distracter' task was given. Here, the children were shown a group of items and were asked which one they liked. Finally, the experimenter handed the child the sweet that was not the one that

he/she had chosen and waited to see if the participant spontaneously denied that it was the chosen sweet. The results were that the majority of the children in each group made an appropriate judgment about all the four 'emotion judgment' situations and almost all the participants in each group named their original choice either spontaneously or following a prompt from the experimenter. The authors concluded that autistic children have some understanding of emotions and desire. Finally, the authors discussed these findings in relation to the current research in this field. They proposed three possible explanations for the fact that children with autism understand some psychological states but not others. They suggested that the notion of a generalized developmental delay in the understanding of mental states must be abandoned and that the most plausible explanation would be a delay in the autistic children's understanding of selected mental states.

Studies such as these have found that some aspects of conceptual role-taking appear to be impaired, and others intact, in individuals with autism. On the one hand, such individuals are good at recognizing where other people are looking as well as remembering aspects of their behaviour, and they seem to have some knowledge of what other people feel in different situations, at least at a level of simple emotions like 'happy'. On the other hand, they appear to have specific difficulties in understanding what other people believe and know. However, these studies assume that conceptual role-taking (i.e. theory of mind) is directly related to the child's understanding of mental state terms and leave aside the possibility that other processes may account for the development of a theory of mind, and therefore its impairment in individuals with autism. For example, the fact that "*we know other people to be subjects of experience*" (Hobson, 1993, p.122) may require a more basic level of interpersonal understanding of their mental states that is required for interpersonal understanding.

The question arises whether there is convincing evidence that the impairment of individuals with autism is *specific* to their limited grasp of representational mental states. For example, there are studies that have explored the perception of 'feelings' in others. It is less clear that the understanding of what another person is feeling is cognitively rooted, and it is possible that non-inferential role-taking is directly linked to this understanding. If individuals with autism have difficulties in understanding 'feelings' in other people, then it is possible that the impairment in grasping concepts of 'belief' and 'know' may not stem from a primary impairment in the ability to metarepresent.

There have been a number of studies that have attempted to examine whether individuals with autism have difficulty in identifying expressions of feelings in others. Hobson, Ouston and Lee (1988) compared the performance of a group of children with autism with the performance of a language-matched group of non-autistic children on an emotion recognition test. This test consisted of a group of photographs of different people, which had to be matched with another set of photographs. In the emotion condition, the participants were asked to match the photographs of different people showing one emotion with photographs of the same people showing a different emotion (for example, a woman with happy face had to be matched with a man with happy face). In the identity condition, the photographs had to be matched according to identity (for example, the woman with happy face would need to be matched with a photograph of the same woman but with an angry facial expression). The results of the study showed that the two groups of participants were proficient in matching still-face photographs in both tests. However, the authors questioned whether the participants with autism were actually using different strategies from the control participants to accomplish the task. To test this idea, the participants were given the same two tests, but this time the mouths and foreheads of the faces had been blanked out. In this case, the participants had to respond according to the 'feel' of each face and therefore the level of difficulty of the task increased. Under these circumstances, the group with autism performed

significantly less well than the control participants in the emotion test, but still performed equally well in the identity test. Finally, the photographs were shown turned upside-down in order to disrupt face recognition and to eliminate the 'feel' of each expression. Here, the performance of the participants with autism improved considerably, whereas the performance of the control participants deteriorated: the performance of the participants with autism was significantly superior to the performance of the control participants on matching both emotions and identities. This result suggests that individuals with autism may be using more perceptually driven matching strategies than non-autistic participants (Hobson, Ouston and Lee, 1988; Ozonoff, Pennington and Rogers 1991) that may be compensating for a more basic impairment in the 'feel' of emotional expressions.

One could therefore argue whether the recognition of emotions in other people involves something more than cognitively representing a certain kind of 'emotional' mental state. In order to recognize emotion one has to feel what another person may be feeling through non-inferential role-taking. A few studies have examined whether individuals with autism have a specific impairment in the subjective 'feeling' of emotions in other people. One study used an innovative method that presented moving dots of light (Moore *et al.* 1997). The dots of light were attached to real people displaying actions and emotional expressions. The participants of this study were 13 young people with autism who were matched according to age and verbal ability with 13 non-autistic participants. First, the authors tested and confirmed that the participants in the two groups could recognize the dots of light as people. Then the participants were shown sequences of the point-light person enacting gestures of different feelings (e.g. surprise or anger). Participants were asked, "*tell me what's happening*". Results showed that significantly fewer participants with autism than control participants described the person's movements in terms of feelings (as opposed to the majority of control participants, who did so). The participants with autism, however, were very accurate in their definitions of what happened, but it was the person's

movements and actions rather than feelings that were reported. For example, a scared figure was described to be '*standing up and moving backwards*'. After this test, the authors wanted to examine how accurately the participants with autism could name actions and emotions when explicitly asked to do so. The participants were presented sequences of dots of light, which were either emotionally expressive sequences (e.g. itchiness, boredom, tiredness, etc), or non-emotional actions (e.g. lifting, hopping, kicking, etc). They were then asked either '*what the person is feeling*' or '*what the person is doing*'. Once again the participants with autism were markedly less successful in identifying the emotionally expressive sequences than in identifying the non-emotional actions sequences.

This lack of being influenced by the emotional responses of other people was also found by Sigman *et al.* (1992), who tested 30 three and a half year old children with autism, children with mental retardation, and 19 month old typically developing children. A remote-controlled robot moved towards the child, and stopped. Then, the parent and experimenter, who were seated close to the child, made fearful facial expressions, gestures and vocalizations in relation to the robot. The participants with autism were less attentive to the adults, and appeared to ignore or not notice the adults showing these negative affects. Moreover, the participants with autism were much more engaged in toy play than the other children, suggesting that they were less influenced by the adult's emotional responses of fear.

What these studies suggest is that although individuals with autism can name emotions in other people in some situations, it is not clear that they perceive other people's expressions of feelings as salient or 'affecting' as other children. In fact, the processes underlying emotion recognition in individuals with autism appear to be different from those of non-autistic individuals, who seem to rely more on the subjective 'feel' of face or bodily expressions rather than on its perceptual characteristics. This was also suggested by a study by Weeks and Hobson (1987), who found that

participants with autism tended to sort photographs of different men and women according to either gender or the fact that some of them were wearing hats; whereas a non-autistic verbally matched group tended to sort the photographs by the facial expressions displayed by the men and women of the photographs. Once again, the participants with autism appeared to be less engaged with expressions of feelings than the non-autistic participants. Ozonoff, Pennington, and Rogers (1990) also reported that individuals with autism performed significantly less well than age and verbal IQ matched non-autistic individuals in matching photographs of both simple and complex emotions.

Therefore, and to conclude, the evidence that individuals with autism have difficulties in conceptual role-taking because they have a primary cognitive impairment in the ability to 'metarepresent' is inconclusive. It seems clear that individuals with autism have difficulties in understanding some mental states, but not others, and the reason for their difficulties do not always seem to stem from cognitive limitations. Studies on the recognition of emotions suggest that although individuals with autism may appear to be proficient in their understanding of certain emotions more subtle methods of investigating have found that individuals with autism may have difficulties in this respect. The processes underlying emotion recognition in individuals with autism seems to differ from those in non-autistic individuals. Therefore, there is some data to suggest that after all, the impairment in understanding mental states may perhaps have its roots in an impairment in interpersonal contact with others, in an impairment in non-inferential role-taking.

2.6 Conclusions

In this chapter, the clinical picture of autism has been illustrated with a case study from Kanner (1943), concerning a person whose lack of social connectedness and involvement with other people was highlighted. Then two theories, the 'interpersonal' and 'theory of mind' theories, were examined in order to provide two different accounts concerning how individuals with autism come to have difficulties in understanding the psychological and emotional perspective of themselves and other people. Whereas the conceptual theory suggests that individuals with autism have an impairment in the modular system that provides young children with the necessary equipment to develop concepts about other people's minds (i.e. conceptual role-taking); the interpersonal theory suggests that a more basic non-inferential role-taking impairment underlines such development. Moreover, contrary to what the theory of mind theory suggests, the interpersonal theory considers that typically developing young children have a sense of the attitudes and feelings of other people before having the concepts to think about them.

Scientific evidence has been examined to study the impairment of individuals with autism in non-inferential and conceptual of role-taking, with the aim of finding evidence to either support or reject the view of the interpersonal theory about the origins of role-taking impairment in autism.

Evidence to support the theory of mind theory was inconclusive. Individuals with autism have difficulties in understanding some mental states, but not others, and such difficulties do not always seem to be accounted for by cognitive limitations. For example, studies of emotion recognition in individuals with autism have found that individuals with autism are proficient in understanding certain emotions; however, when using more subtle methods of investigating,

individuals with autism show difficulties in this respect. They appear, therefore, to use different compensatory strategies than non-autistic children, in some situations to achieve the same goals.

In relation to the interpersonal theory of autism, impairments in primary and secondary intersubjectivity have been reported in individuals with autism. Nevertheless, reports from parents and family home movies provide ambiguous results about the lack of social connectedness of children with autism during the first year of life. These results make it difficult to either rule in or rule out the suggestion of the interpersonal theory that an impairment in non-inferential role-taking is present from birth in individuals with autism. In addition, there have been some studies that have examined the lack of identification of individuals with autism with other people, and have found some evidence to support this proposal. Moreover, studies with congenitally blind children, and children raised in Romanian orphans, have provided evidence to support the hypothesis that an early deprivation of social contact (either biologically rooted as in the case of individuals with autism and congenitally blind, or environmentally rooted as in the case of children raised in Romanian orphanages) can lead to a pictures similar to that of autism.

The studies in this thesis are not designed to examine whether early limitations of role-taking *lead to* the social impairments in autism, but rather, to test whether in relatively older children and adolescents, there is evidence for *qualities of impaired role-taking* that seem to be in keeping with the interpersonal theory of autism and beyond that which could be explained by the ‘theory of mind’ theory. As already outlined, behind these studies lies the hypothesis that individuals with autism have an impairment in the ability to adopt different psychological perspectives (conceptual role-taking), because of more basic impairments in identifying with and moving (with feelings and attitudes) to the perspectives of other people (non-inferential role-taking). The following chapters will examine how far children with autism have the ability to adopt different

psychological perspectives, from three perspectives: narrative role-taking (Chapter 3), deixis (Chapters 4 and 5), and non-verbal interpersonal communication (Chapter 6).

CHAPTER THREE

Narrative role-taking in Autism

3.1 Introduction

It is a commonplace observation that individuals with autism tend to be insensitive to the feelings and thoughts of others. One potentially helpful way of capturing this is to consider their difficulties in taking the role of another person.

Previously described in Chapter 2, the theory of mind theory suggests that the difficulties people with autism have in understanding the perspectives of other people stem from an impairment in understanding specific mental states. The hypothesis underlying the present thesis is precisely the opposite, that a difficulty in relating to others and in moving to the psychological position of other people is what leads individuals with autism to have problems in understanding specific mental terms and difficulties in adopting the perspective of another person. The latter hypothesis has been suggested by the interpersonal theory. This chapter will examine the ability to adopt the role and/or the perspective of another person in individuals with autism.

3.2 Narrative role-taking in autism

Role taking in people with autism has been studied from different research perspectives. In the area of the pragmatics, for instance, researchers have been interested in the way individuals with autism modify their language according to social context (Baltaxe, 1977; Menyuk, 1969; Prutting, 1982; Loveland *et al.* 1990, Tager-Flusberg, 1981). For instance, adjustment in language may depend upon mutual understanding between speaker and listener, including their current feelings (Tager-Flusberg, 1993). Individuals with autism have difficulties in taking into account a listener's needs in conversations (Loveland *et al.* 1990) and have an inability to use markers of

time and place in narrated events (Bartolucci and Albers, 1974; Bruner and Feldman 1993, Loveland and Tunali, 1993). Some researchers have argued that these impairments are related to theory of mind deficits in autism (Tager-Flusberg, 1995).

Conceptual role-taking has been studied by examining not only whether young people with autism understand mental states (see Chapter 2), but also whether they use mental states in their narratives. Tager-Flusberg (1992) carried out a longitudinal study with six young people with autism (aged 3 years and 4 months to 7 years 7 months) and Down syndrome (aged 3 years 3 months to 6 years 9 months), respectively, who were matched according to chronological age and language level, as measured by the mean length of utterance (MLU). Transcripts of spontaneous speech protocols of the children in different activities (e.g. playing with toys) were collected bimonthly. All the psychological terms used by the children were classified into one of the following: desire (e.g. want), perception (e.g. listen), emotion-behaviour (e.g. cry), emotion (e.g. sad) and cognition (e.g. believe). Each one of these categories was divided into subcategories. For example, perception terms included vision, hearing, touch, smell, taste and attention; and cognition terms included idiomatic, conversational and mental terms. Results showed no significant differences between the two groups in the desire, perception and emotion terms used. However, the participants with autism were significantly less likely than control participants to refer to attention (e.g. use of 'look', 'see' or 'watch' to call something to their mothers' attention) and mental states (e.g. use of 'belief', 'knowledge', 'imagination', 'dream' or 'memory' terms). The author wrote:

“ Without the language to talk about cognitive states, it is no wonder that autistic children have such difficulties in social understanding and social relationships...” (p.170).

The results of studies of conceptual role-taking appear to vary considerably depending on the matched groups. For example, Tager-Flusberg and Sullivan (1995) examined a range of lexical cohesive devices in a set of narrative stories in a group of children with autism, to examine the relationship between narrative ability and theory of mind. The participants were 27 young people with autism (aged 6-22 yrs, IQ 43-92) who were compared with 27 non-autistic mentally retarded participants (aged 7-17 yrs, IQ 52-96) and with 17 normally developing participants with chronological ages comparable to the mental ages of the other two groups (aged 7-10 yrs). The groups with autism and with mental retardation were matched according to language ability, as measured by the CELF (Clinical Evaluation of Language Fundamentals), which provides information about the participant's sentence comprehension and productive language ability. The participants with autism were significantly older than the participants of the other groups. The participants were shown a wordless picture book with several stories described with pictures. Pilot work indicated that such book was likely to elicit numerous cognitive and emotion terms. Each participant was shown a story by an experimenter who said nothing to the child about the story. Then, the participant was asked to tell the story to another experimenter who had never seen the book before. To test theory of mind understanding, the groups with autism and mental retardation were shown other stories that were created to assess the participants' understanding of false belief. These were stories of characters that knew that another person had a false belief of a situation; for example, a boy whose mother is cooking spaghetti, but he thinks she is making hamburgers for dinner. Participants were then asked questions about the theory of mind stories (e.g. *"What does Ricky think Mum made for dinner?"*) to test their understanding of false belief. Results showed no significant differences in the number of emotion and related feeling state terms used by the participants. Also, contrary to what the authors expected, very few cognitive terms were used by the participants in any group (between 22 and 37 percent of the participants of each group), suggesting that the selected narrative task was not well suited for this purpose. As a result of this, it was not possible to reach a conclusion in relation to the

participants' use of cognitive terms. A high number of participants in both groups passed the false belief task. For both groups there was a strong association between passing the false belief task and talking about the cognitive states of story characters. The findings of this study indicate that if the groups are carefully matched on measures of linguistic ability, some of the reported differences between these groups are eliminated. The participants with autism were preselected for their advanced linguistic ability, and therefore may not be representative of the range of participants who are usually selected for this kind of study.

There are other studies that have also found fewer differences between individuals with and without autism than would be expected when examining the psychological content of their narratives. Lee & Hobson (1998) examined the content of what a group of 12 participants with autism (aged 9 years 2 months to 19 years; and VMA 4 years 4 months to 9 years 9 months) and ten non-autistic mentally retarded participants (aged 12 to 17 years one month; and VMA 4 years to 9 years 3 months) said about themselves during a self-understanding interview. The two groups were matched according to chronological age and verbal mental age. They were also comparable in the mean length of their utterances (MLU). The interview took between 35 and 60 minutes. The participants were asked questions about themselves (e.g. *'What kind of person are you?'* or *'What makes you different from anyone you know?'*) in order to study whether their relative lack of interpersonal engagement was associated with limited reflective self-awareness (Hobson, 1990, 1993), as well as a failure to integrate other people into their self-characterisations. In accordance with the authors' predictions, participants with autism produced significantly fewer statements of a 'social' category (e.g. including attributes related to social interactions and social relations), even though they were very similar to the control group in producing other kinds of self-concepts, including psychological concepts (which concerns the individual's emotions, thoughts, preferences, or other cognitive processes). Not one participant with autism made a social statement that referred to friends or being a member of a social group, whereas the majority of the

control participants explicitly acknowledged others in their definitions of self. One possible interpretation of this result is that the restricted experience of interpersonal contact with other people constrains the social experience and understanding of people with autism. This lack of experience of other people appears to affect the concepts that they have about themselves and other people, even though they use psychological concepts of emotions, thoughts or preferences.

Therefore, the studies of Tager-Flusberg and Sullivan (1995), and Lee and Hobson (1998) suggest that individuals with autism with good linguistic abilities appear to use as many psychological concepts of emotions, thoughts, preferences, or other cognitive processes than non-autistic matched control individuals. Tager-Flusberg and Sullivan also found a strong association between passing the false belief task and talking about the cognitive states of story characters. However, even though these individuals talk about some psychological states of other people, they seem to use fewer social statements related to social interactions and social relations (Lee and Hobson, 1998) when talking about themselves.

Thus, although individuals with autism seem to have some knowledge of other people's mental states, it remains possible that they do not have a clear differentiation between their own perspective and that of others, as evidenced in their lack of statements of other people. Baltaxe and Simmons (1977) found that the bedtime monologues of a girl with autism reflected only a hearer's perspective, in contrast to the monologues of typically developing children who tended to imitate a dialogue between two persons. This may suggest a difficulty in managing changes in point of view (Loveland and Tunali, 1993).

One way of studying whether or not individuals with autism move flexibly across different viewpoints is by examining how they organize stories in relation to their characters. Very few

studies have examined this aspect of story narratives in detail. Loveland and Tunali (1993) gave the following description of story narratives:

“A story-narrative is expected to be an organized series of causally-related event-descriptions that deal with some topic or lead to some point ... Only after several years’ practice do children begin to produce adult-like narratives. ...Both fictions and anecdotes require an understanding of event causality and linguistic tools for describing events. ... In the case of re-tellings, much of the distinction between fiction and anecdote disappears, since the teller need not construct the fiction. ... Stories may also be spontaneous or elicited. ... This technique (Elicited stories), has the virtue of insuring some degree of uniformity of content among the narratives of different tellers, enabling the experimenter to make comparisons more directly. However, it does not reveal whether the subject can make up a story ‘out of the whole cloth’”. (p. 249-50).

Thus, re-telling a story is a highly demanding task that requires taking into account several aspects of the story at once, like the distinction between reality and fiction. Loveland and Tunali (1993) suggested that re-telling stories should be difficult for people with autism because it involves a need to make references clearly, to interpret the meaning of the material, and convey it to the listener clearly. In addition, original story-telling should be most difficult for a person with autism, because it involves few structuring limits and the choice is unlimited.

Loveland *et al.* (1990) investigated narratives of a group of high functioning individuals with autism when re-telling a story from a puppet show or a videotaped sketch, for the reason that this ability might reflect the child’s ability to describe everyday events to a conversational partner. A group of 16 participants with autism (their mean CA was 13 years and 6 months, and their mean VMA was 6 years) was matched according to chronological age and verbal ability with a group of 16 participants with Down’s syndrome (their mean CA was 13 years and 3 months and their mean VMA of 5 years and 9 months). Before showing the puppet show to the youngest participants, and a videotaped sketch with actors, of similar nature, to the oldest participants, the participants were told that they would be asked some questions about the stories after its presentation. Each story involved a thief who tries to steal something from a main character, but is driven away. The story was presented twice, and then another experimenter entered the room and asked: “Tell me

the story. What happened in the story? Results showed that the participants with autism were to some extent able to interpret the story presented, and to tell the story to a listener. However, the kinds of narratives in children with autism reflected a lack of organization and clarity, poor grammar, intrusions and incoherence. They also displayed a failure to anticipate the listener's needs for new or previous information. Some of the narratives given by individuals with autism suggested that they do not fully understand characters' thoughts or motivations, reporting mainly the characters' actions. In this case, 37 % participants with autism, and only 6% of the control participants, understood the puppets mainly as moving objects, rather than as characters of a story. The authors said, "*this deficiencies might reflect a broader difficulty in appreciating meaningful aspects of human activity and the human world*" (p.19), suggesting that the social deficits in autism is not limited to an impairment in understanding other people's thoughts and feelings. They suggested that what seems to be lacking in individuals with autism is a "*human cultural perspective*"(p.21).

One interesting observation came from an anecdote of a high functioning male with autism who participated in this study (Loveland and Tunali, 1993). About an hour and a half after having narrated a story to an experimenter, he spontaneously re-told the story to his mother during a free interaction session. What the authors noticed was that his meanings were obscured by distortion of grammar and failure to specify the referents of pronouns. Moreover, when retelling the story he betrayed a lack of awareness that the story was fiction instead, telling it as if it really happened. The authors suggested that, although it is difficult to know the source of this confusion, this might be an indication of a failure to understand the character's motivations in the story context.

To conclude, most of the research undertaken to examine whether individuals with autism understand the perspectives of other people has focused on the understanding or use of certain

psychological terms. Some studies have also examined the linguistic organization of stories produced by individuals with autism in relation to their pragmatic understanding. However, it is unclear to what extent people with autism can take the role or the perspective of different characters within a story, and whether they can move across their different perspectives. This is an important aspect of role-taking still to be examined. One of the difficulties of this type of research, as Loveland and Tunali (1993) emphasised, is to design a sensitive method of approach, especially when the aim is to study participants' original story tellings.

The aim of this chapter is to examine whether role-taking abnormalities are reflected in the story-tellings of individuals with autism within a formally structured role-taking task, and to determine more precisely the nature of any limitations in their role-taking ability. Although the participants with autism were encouraged to tell new stories, these were based upon similar material across participants in order to obtain consistent stories.

3.3 A study to examine role-taking in young people with autism

The present study investigates the degree to which children with autism have difficulties in adopting the perspective of another person. More specifically, its aim is to assess whether the children can adopt complementary roles within stories. The method was to employ a task designed by Feffer (1970) for use with participants with mental delay. This evaluated whether participants were able not only to adopt the role of a character of a story (e.g. "I am a mum and I cooked dinner for the boy"), but also to adopt the perspective of such a character (e.g. "My son loved the dinner that I cooked for him"). The ability to move from the perspective of one character when telling a story, to the perspective of another character when retelling the same story, was also assessed (e.g. from the son's point of view: "I loved the dinner that my mum

cooked for me”). The co-ordination of the content of the stories that the participants told from different characters’ viewpoints was an additional feature of this role-taking task.

3.3.1- Hypothesis and predictions

The hypothesis underlying this study is that social connectedness is important in determining more sophisticated kinds of interpersonal understanding, such as inferential and conceptual role-taking, and that children with autism are handicapped in this respect.

For the present study, the predictions concerned the manifestations of impaired role-taking in producing stories:

a) The principal prediction was that compared with a language-matched group of individuals without autism, children with autism would score lower on Feffer's measure of *overall role-taking* ability, as applied to the stories they produced.

b) A subsidiary prediction concerned the pattern of results on the component indices of role-taking *within* Feffer's overall measure: *that 'perspective-taking' (which covers the most 'social' of Feffer's indices) would contribute more to group differences than story co-ordination (which also implicates more cognitive abilities).*

c) A second subsidiary prediction was *that individuals with autism would score lower on 'change of perspective' than the non-autistic participants.* Change of perspective was the ability to retell one story from the perspective of two different characters.

d) The final prediction *was that group differences in role-taking ability would not be explained by the participants' lack of mental state concepts, as revealed in their stories.* The importance of this is to examine whether the autistic child's difficulties in understanding other psychological perspectives might be reduced to the use and comprehension of mental terms.

3.3.2- Participants

The participants of this study were 15 children and adolescents with autism and 15 children and adolescents with mental retardation but without autism. All the participants with autism fulfilled diagnostic criteria for autism according to the Diagnostic and Statistical Manual of Mental Disorders, (DSM-IV: American Psychiatric Association, 1994- See Appendix 1) and the Childhood Autism Rating Scale of Schopler, Reichler, & Renner (CARS: Schopler, E. *et al.* 1986- See Appendix 2). The two groups were group-matched for chronological age and language ability derived from the participants' performance on the British Picture Vocabulary scale (BPVS: Dunn *et al.* 1982). Although the BPVS is a widely used measure of verbal mental age in studies with children with autism, the profile of linguistic skills in individuals with autism is different from that of other groups of children. In the present study, the participants were given a linguistic task where they were asked to tell stories about different characters. Therefore, it was necessary to establish that the two groups participating in the study were comparable in relevant linguistic skills, in order to ensure that any difference in their performance on the task was not due to differences in language ability.

It was also important to establish that the two groups were comparable in the complexity of their language output. Therefore as a supplementary procedure the mean length of utterance (MLU) was calculated for each participant. This was achieved by counting the number of morphemes per utterance, using the participant's first 50 utterances in the role-taking task, as shown in Appendix

3 (Brown 1973). The participants with autism had a mean MLU of 6.14 (SD 1.61 range 3.92 to 9.90) and the participants without autism had a mean MLU of 6.90 (SD 1.92 range 4.27 to 11), $t = -1.2$, $df = 28$, ns. In order to establish that the amount of verbal output was also similar in the two groups, the number of words used by each participant in the task was counted. The participants with autism had a mean number of words of 105 (SD 65, range 37 to 210) and the participants without autism had a mean number of words of 107 (SD 59, range 24 to 216). Therefore in these respects the two groups were comparable.

Participant characteristics are presented in Table 3.1. The chronological ages of the two groups ranged between nine and eleven years, and the verbal mental age between approximately four and eleven years. In the group with autism there were 14 boys and one girl, and in the control group 11 boys and four girls.

	Chronological Age			Verbal Mental Age (BPVS)			Mean Length of Utterance (MLU)		
	Mean yr;mo	SD yr;mo	Range Yr;mo	Mean yr;mo	SD yr;mo	Range yr;mo	Mean	SD	Range
Autistic n=15	13;04	2;10	9;08-17;03	6;09	1;09	4;09-10;07	6;16	1;67	3;92-9;90
Non-autistic n=15	14;02	2;11	10;10-19;0	7;02	1;10	4;05-10;04	6;90	1;92	4;27-11;00

Table 3.1 Narrative RT study: Participant characteristics

3.3.3- Method

Participants were tested in their own schools in a quiet room by one experimenter. The task was a structured role-taking task which was designed to be used with children with mental delay

(Feffer, 1966). Fifteen drawn cut-out human figures, each 8.5cm high, were presented to the participants. They depicted a range of different people: for example a nanny, a policeman or a little girl. There were also seven drawings of background scenes: for example, a classroom, an empty street or a living room.

Each participant was asked to produce two stories in relation to three characters and two different background scenes. For the first story, the participant was given the 'living room scene' as a background, and was asked to select three characters from the 15 available figures to take part in the story. Once the participant had selected the figures he or she was given the following instructions:

'I want you to make up a story with a beginning a middle and an end about this scene and these people'.

After the participant had told the story, the experimenter said:

'Now I want you to tell me the very same story again as if you are....(one of the figures that featured often in the story was selected)...so this time you are the...'

Once the participants had retold the story from the point of view of the chosen character, then he or she was asked to retell the very same story again, but this time from the point of view of another character. The instructions were as follows:

'I want you to tell me the very same story again but this time you are the'
(The character that interacts the most with the main character was chosen by the investigator).

When the first story had been completed, the whole procedure was repeated a second time. In this case, however, the participant was invited to choose which background scene he or she wanted for the story, as well as which three of the remaining 12 drawn figures would take part.

The critical issue was how far the participant would adjust and elaborate each account so that each version was described from the perspective of the main character, and therefore the other characters (the second characters) were described from the protagonist's point of view.

All the participants were prompted by the experimenter if necessary with questions such as '*So what happened next?*', '*What did the mum do?*, etc.

Participants were audio and video taped while being tested on Feffer's role-taking task. Transcriptions of the stories were used for rating purposes, and the videotaped information was only used when it was not clear from the transcriptions which character the participant was referring to.

3.3.4 Scoring of the Role-Taking Task

Although the scoring criteria were based on those used by Feffer, some changes were introduced in the ways in which the scores were organized in order to simplify the previous complex scoring system. All the modifications will be highlighted. The following illustrates the structure of the scoring. The terms and scoring procedure will be explained later on with more detail in the text.

There were two stories and two versions of each story. For each version of a story, participants were scored for,

- a) Adoption of a role (item score 0-2): whether or not the child took the role of the main character.
- b) Adoption of a perspective (item score 0-2): whether or not the child put him/herself into the character's shoes.

c) Co-ordination of story content (item score 0-4): whether or not the content of the role-taking versions was the same as the content of the main stories.

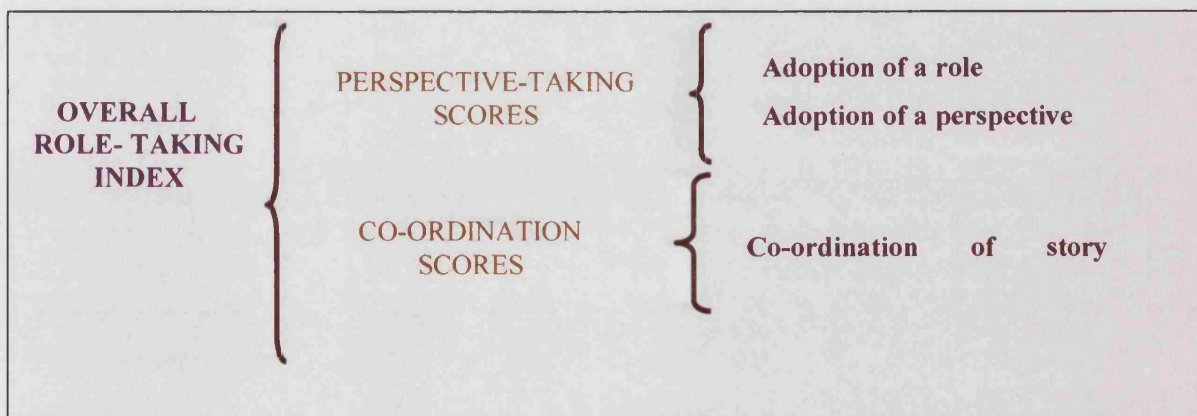
In addition, the two versions of each story were considered in relation to one another. This generated a further score for

d) Change of perspective (item score 0-4): whether or not the child adopted the perspective of one character on the one hand, then the perspective of another character within a different version of the same story on the other hand.

Then the scores were combined as follows in the Table 3.2:

Table 3.2 Narrative RT study: Scoring procedure

Therefore the transcriptions of four accounts comprised the material used for ratings. What follows is a description of the overall scores and each one of the role-taking components. In



addition, the classification of the psychological terms used by the participants will also be described.

- Overall Scores

a) *Overall Role-Taking Index* (Feffer's overall index score) max score=32: This is a composite measure that combines "perspective taking" and "co-ordination" scores.

b) *Perspective Taking scores* (Feffer's role-taking shift) max score=16: This is the composite score that combines 'adoption of a role' and 'adoption of a perspective'.

c) *Co-ordination scores* (Feffer's role-taking co-ordination) max=16: This is the composite score that combines all the co-ordination scores given to the main and the second characters on each version.

d) *Change of perspective* (Feffer's change of perspective score) max score=4: This is a score calculated from the profile of the 'adoption of a perspective' score of the two versions of each initial story. Here, whether or not the participant was able to move from the perspective of one character in one version, to the perspective of the other character in the other version of the same story, was studied. This score will be described in more detail later.

- Role-taking Components.

Each role-taking version produced by the participants received a score within different role-taking components: 1) adoption of a role, 2) adoption of a perspective, and 3) co-ordination of story content.

a) Adoption of a role (Feffer's 'self-entry') max score per version=2:

This is the ability to describe the main character according to his or her role. It is important to stress that to take a role does not necessarily mean taking the perspective of a character since the participant could be describing the main character according to his/her role attributes without modifying the story or the description of the other characters from the main character's point of view. The description of the main character for each of the role-taking versions was given a rating that ranged from 0 to 2, where a score of 0 was given for no adoption of a role, and a score of 2 was given for good adoption of a role, as follows:

a.1- Score 0 (Feffer's No Role-Taking score):

Criterion: The participant received a score of 0 when he or she neither took the role of the main character nor showed any degree of elaboration of a perspective when describing the main characters of the stories.

Example: a boy with autism said, “ *That boy was going to bed. He was having a bath before he goes to bed....* ”

a.2- Score 1 (Feffer's Simple Role-Taking score):

Criterion: The participant received a score of 1 when the main character was not described according to his or her own role, but in this description there was some elaboration of a role. For instance, the use of dialogue could be a sign that the participant had some degree of understanding of the protagonist's role.

Example: a girl of the control group said, “(*boy*) *Hi Sue. (girl) Hi, what have you done to your leg? (boy) Oh I fell off a tree. Went on holiday. (girl) Did you have a nice holiday?* ”

a.3- Score 2 (Feffer's role-taking score):

Criterion: The participant received a score of 2 when he or she described the main character according to his or her role. To show a correct use of personal pronouns (for instance to use 'I' every time that the participant refers to the main role-taking character) was sufficient to receive a score of 2.

Example: a boy with autism said, "*So I stick out my tongue at the girl, and the teacher tell me off, send me to the Headmaster, and he said 'This is your one more chance'. I went outside. I hit the girl and the teacher said 'You are expelled from school!'*"

b) *Adoption of a perspective* (Feffer's 'elaboration entry') max score per version=4:

This is the degree to which the characters of each version were described from the main character's point of view. Thus, the critical feature is how the story was modified according to the perspective of the main character. Here the description of the story from the main character's viewpoint was rated according to the following criteria:

b.1- Score 0 (Feffer's Character Elaboration together with the PE0 score):

Criterion: the participant received a score of 0 when the second characters were not described as seen from the perspective of the main character. A score of 0 was also given to those versions where the content of the story had important discrepancies in relation to the content of the initial story, so even if the participant was adopting a perspective, this perspective was not the one of the main character (the participant could be making up a different character).

Example: a boy of the control group (who received a score of 2 in 'Adoption of a Role' and a score of 0 in 'Adoption of a Perspective') said: "*I'm the mum and I'm doin' the nurse. And helpin' the boy is on crutches with the plaster leg. And the dad is waiting*"

b.2- Score 1-2 (Feffer's Perspective Elaboration 1 and 2):

Criterion: the participant received a score of either 1 or 2 when the second characters were distinguished in relation to the perspective of the main character.

b.2.1- Score 1 (Feffer's PE1 score):

Criterion: the participant received a score of 1 when the story was described from the point of view of the main character, in terms of specific actions.

Example: a boy with autism (who received a score of 2 on 'Adoption of a Role and a score of 1 on 'Adoption of a Perspective') said, " *Once upon a time I was coming, I was walking through the door and I saw my big brother and my small brother and I gave them a present. I gave Andrew a watch, my small brother a watch and my big brother a coat....* "

b.2.2- Score 2 (Feffer's PE2 score):

Criterion: The highest score of 2 was given when the participant used psychological terms when retelling one story from the main character's viewpoint.

Example: a girl of the control group (who received a score of 2 on 'Adoption of a Role and a score of 2 on 'Adoption of a Perspective) said: " *Once I got my son some presents 'cos it was his birthday. ..and he had a dog because he's always loved dogs...I bought him a dog...he loved it...the dog ate the choke so me and my wife had to take him to the vet....* "

c) Co-ordination of story content (max score per version=6)

Criterion: Co-ordination is *the degree to which the content of each version is compatible with the content of the initial story*. What is evaluated here is whether the participant is retelling the initial story and not making up a new one. In Feffer's original coding system, co-ordination was a single score that merged the co-ordination of the description of both main and second characters in

relation to the initial story. In the current scoring system a score of co-ordination was given to the main and second characters respectively, because in some cases it was difficult to give a single score.

Each score of co-ordination ranged between 0 and 2, where 0 meant poor co-ordination of the story content and 2 very good co-ordination. Therefore, the maximum score for co-ordination per version was 4 after having added the two co-ordination scores for both first and second characters.

- Change of Perspective (max score per two versions=4):

Criterion: Change of perspective is the degree to which the participant was able to move from the perspective of one character in one version, to the perspective of the other character in the other version of the same story. Therefore 'change of perspective' was scored considering the two versions in relation to one another. The participant received a score higher than 0 when he/she described the initial story from the perspective of two different characters, adopting the perspective on each version of the same story. Therefore, in order to score more than 0 on 'change of perspective', a participant had to score at least 1 on 'adoption of a perspective' in both versions.

The scores for 'change of perspective' were the following for each pair of versions:

a) Score 0: This score was given when the participant had a score of 0 on 'Adoption of a Perspective' in at least one version.

b) Score 1: This score was given when the two versions received a score of 1 on 'Adoption of a Perspective'.

c) Score 2: This score was given when at least 1 version received a score of 2 on ‘Adoption of a Perspective’; and the other version received a score of at least 1.

- Psychological Terms (not from Feffer)

In addition, all the psychological terms used by the participants in each role-taking version were categorized according to the classification used by Tager-Flusberg (1992). Each psychological term was classified into one of the following categories: a) Desire (e.g. care, want, wish), b) Perception (e.g. watch, cold, smell, taste), c) Emotion-behaviour (e.g. cry, kiss, smile), d) Emotion (e.g. angry, happy, hate), and e) Cognition (e.g. believe, forget, think).

3.3.5- Reliability of scoring.

The assessment of inter-rater reliabilities was based on the ratings of two independent judges rating 20% of the data (three participants with autism and three non-autistic participants). The degree of agreement was evaluated by calculating the Kappa coefficient, which takes into account the likelihood of chance agreement between the raters. The Kappa coefficients (Landis and Koch, 1977; See Appendix 4) were 0.63 for perspective-taking and 0.78 for co-ordination scores, reaching substantial agreement between the two raters. The Kappa's coefficient for ‘adoption of a Role’ was 0.76, and for ‘adoption of a perspective’ was 0.92, reaching substantial and almost perfect agreement respectively.

3.3.6- Results

I shall begin by presenting the formal results in relation to the *a priori* predictions and will conclude with an informal overview of the content of the stories. Although there were no predictions in relation to the latter part of the study, such a description will provide a framework for interpreting the more specific results.

- Formal results

The scoring method outlined by Feffer yields data that are mostly ordinal rather than interval in quality. For example, there are variables that are created by adding up four scores that are rated with a 0-2 point scale where zero means low performance and a score of two means good performance. Therefore two people may score for instance 5 and have four 0-2 point scale scores. For this reason nonparametric analyses have been adopted. However, parametric statistics will be used for descriptive purposes.

a) Overall Scores

a.1- Overall Role-Taking Index (max score 32): The prediction in relation to the overall role-taking score was that compared with a language-matched group of individuals without autism, children with autism would score lower on Feffer's measure of *overall role-taking* ability. This difference was confirmed to be significant (mean rank autistic 12.7, mean rank non-autistic 18.3, Mann-Whitney $U=71$, $p<.05$, one-tailed). Figure 3.1 shows the distribution of the participants on the overall role-taking scores. In this figure one can see how the majority of participants with autism are distributed among the lower scores, although some participants with autism managed

to score relatively high in role-taking (three of them very highly), suggesting that some individuals with autism can achieve a sophisticated degree of role-taking.

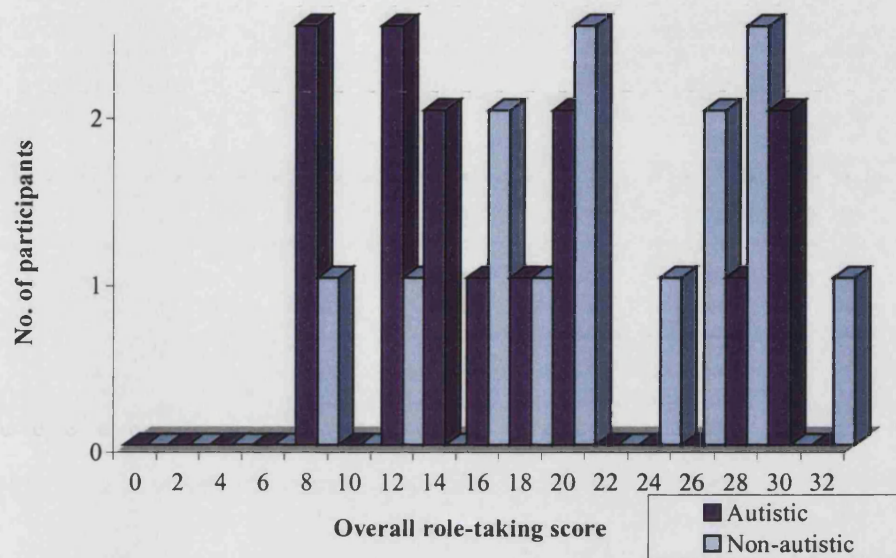


Figure 3.1 Narrative RT study: Overall role-taking score

The correlation between verbal mental age and ‘overall role-taking score’ was analysed with a Spearman’s non-parametric correlation coefficient. This was shown to be significant in the control participants (Spearman’s coeff .69, $p < .005$), but *not* in the participants with autism (Spearman’s coeff .33, ns). This finding suggests that role-taking and mental age are not as strongly related in individuals with autism as in non-autistic individuals.

a.2- Perspective Taking and Co-ordination scores (max score 16 each): The first subsidiary prediction was that ‘perspective-taking’ contributes more to group differences than story co-ordination, because it is more dependent on social factors than co-ordination. To test this prediction two scores, one for each component, were derived. A total score of ‘perspective taking’ was calculated by adding the scores of ‘adoption of a role’ and ‘adoption of a

perspective'. Then, the general 'co-ordination' score was calculated by adding all the scores of co-ordination of story versions for both the main and the second characters. The mean score for perspective taking was 5.5 (SD: 4.7) for the group with autism and 8.2 (SD: 3.7) for the control group, the mean score for co-ordination was 10.7 (SD: 4.8) for the group with autism and 12.7 (SD:3.9) for the control group. As predicted, there was a significant difference between both groups in 'perspective-taking' (Mann-Whitney $U=69$, $p<.05$, one-tailed) but not in co-ordination (Mann-Whitney $U=84$, ns, one tailed).

Given that the scores of both perspective-taking and co-ordination ranged between 0 and 16, a Mann-Whitney test analysis with the difference scores between co-ordination and perspective-taking was conducted to examine whether there was an interaction between these scores. This analysis showed no significant interaction between the variables, suggesting that the two groups scored higher on co-ordination than perspective-taking as Figure 3.2 shows.

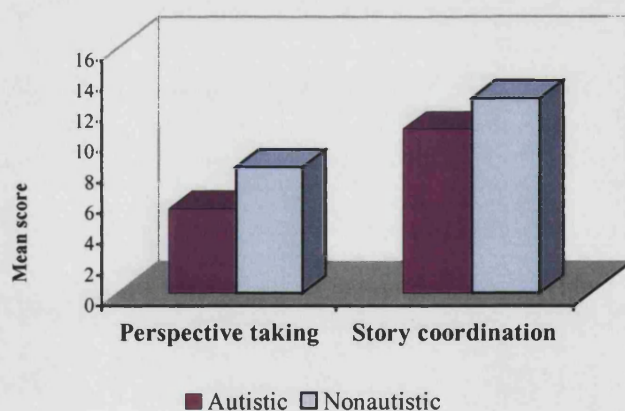


Figure 3.2 Narrative RT study: Perspective-taking and Co-ordination mean scores.

a.3- Change of perspective (max score 4): A second subsidiary prediction was that individuals with autism would score lower on 'change of perspective' than the non-autistic participants. Change of perspective was described as the degree to which the participant was able to retell the very same initial story from the point of view of two different characters. What this means is that in order to score more than 0 on 'change of perspective', participants are required to have scored more than 0 on 'adoption of a perspective' in the two versions of the same story. Table 3.3 shows that 3 out of 15 participants with autism, and 9 out of 15 participants without autism, described the two versions of at least one story from the point of view of the main characters, a significant group difference (Fisher's exact test, one tailed, $p = .030$).

	At least one CP	No episodes
Autistic Group n = 15	3	12
Control Group n = 15	9	6

Table 3.3 Narrative RT study: Number of Ps who changed perspective in at least one story

- Psychological Terms (not from Feffer)

The final subsidiary prediction was that group differences in role-taking ability would not be explained by the participants' lack of mental state concepts, as revealed in their stories. Table 3.4 shows the number of participants who used terms in each psychological category at least once. The two groups were remarkably *similar* in their use of psychological terms. If one considers those participants who used these terms more than once (see Table 3.5), the number of terms used is also very similar. The two groups used 'desire' terms like, want, need or hope; 'perception'

terms like watch, see or listen; ‘emotion-behaviour’ terms like fight, cry or smile; ‘emotion’ terms like miserable, happy or worried; and ‘cognition’ terms like know, think and believe

	Desire	Perception	Emotion-Behaviour	Emotion	Cognition
Autistic group n=15	7	12	8	14	8
Non-autistic group n=15	6	12	5	10	9

Table 3.4 Narrative RT study: Number of Ps who used mental terms at least once

	Desire	Perception	Emotion-Behaviour	Emotion	Cognition
Autistic group n=15	1	8	2	10	4
Non-autistic group n=15	1	7	1	9	5

Table 3.5 Narrative RT study: Number of Ps who used mental terms more than once

- Perspective-taking Components

Next I shall report the performance of each group on each one of the ‘perspective-taking’ components: ‘adoption of a role’ and ‘adoption of a perspective’.

a) Adoption of a role (max score= 8): The ability to take the role (but not the perspective) of the main character was tested. This score was created by adding the scores of ‘adoption of a role’ of each version. The maximum score for each version was 2, which means that the participant was

able to take the role of the main character. The 'adoption of a role' score also includes a score of 1 for those participants who showed some ability to adopt a role (e.g. using dialogues among participants).

The group with autism showed a tendency to score lower on adoption of a role (Mann-Whitney test, $U=74.5$, one tailed, $p=.056$). At this point it was important to examine the profile of the scores, in that this would identify the numbers of individuals who were relatively unable or consistent in role-taking. In relation to the maximum scores in 'adoption of a role', 8 participants with autism and 12 participants without autism took the role of the main character in *at least one* of the four role-taking versions. However, in relation to the minimum scores in 'adoption of a role', 8 participants with autism but not a single individuals among the control participants did *not* take the role of a character in at least one version (Fisher's exact test, two tailed, $p<.003$).

Although there was a greater number of participants with autism who did not take the role at all (scoring zero) in *at least one* of the four role-taking versions, it is important to highlight that only *two* participants (both with autism) scored zero in adoption of a role in all four versions. Therefore, most of the participants with autism (although scoring zero in at least one version) achieved some degree of role-taking.

b) Adoption of a perspective (max score = 8): this is the degree to which the story was described in relation to the main character's point of view. Here, the second characters were seen from the perspective of the main character.

Again, there was a trend for participants with autism to achieve lower scores (Mann-Whitney Test, group with autism mean rank = 13.17, control group mean rank = 17.83, two tailed, $p=.12$).

As in the case of 'adoption of a role', this score comprises the total scores across four story versions, and therefore it is important to explore the participants' responses in more detail.

In relation to those participants who adopted the perspective of the main character (either describing it in terms of specific actions or in psychological terms), there were 5 participants with autism and 10 participants without autism who adopted the perspective in at least one version (Fisher's exact test, two tailed, $p = 0.14$). However, among those participants who adopted a perspective, only a few in each group conveyed psychological orientations in at least one of the four role-taking versions (3 out of the 5 participants with autism, and 4 out of the 10 control participants who adopted a perspective). The remaining 2 participants with autism and 6 participants without autism who adopted a perspective in at least one of the four role-taking versions, did so in terms of specific actions.

- Background to formal results.

I shall now give a brief description of the topics that the participants chose for their stories, as well as a description of how the different characters interacted with each other in their stories.

Participants in both groups told stories concerned with similar topics. For example, in the versions of the first story (where the living-room was used as the background scene), participants told stories about matters involving a family (six participants from each group) and robbery (five participants from each group). Among the remaining participants, one control participant made up stories about getting ready, two control participants about helping others, one participant with autism about hunting, another child with autism about watching television, and one participant in each group described social events, such as having a cup of tea with someone else. For the second story, participants chose the following background scenes: 6 autistic and 3 control participants chose the doctor's surgery as the background scene, 3 autistic and 7 control participant chose the

classroom, 2 autistic and 2 control participants chose the street corner, 3 autistic participants chose the bedroom, and 1 autistic and 3 control participants chose the shop scene. In these versions, participants of the control group tended to make up stories about misbehaving in school (3 autistic and 7 control participants) and about robbery (2 autistic and 6 control participants), whereas relatively more participants with autism told stories about doctor/illness (5 autistic and 2 control participants). The remaining 4 participants with autism made up stories about shopping (1 participant), helping others (2 participants) and about a row (1 participant).

To explore how the characters of the stories were related to one another, a rater who was blind to diagnosis rated the degree of interaction, and the emotional and psychological engagement, among the characters that the stories conveyed. No inter-rater reliability was calculated in this section of the results because the purpose here was to explore the content of what the stories that the participants produced, on a descriptive level.

a) Interaction among characters: The aim here was to study whether or not the characters interacted with each other in the stories produced by the participants. Thus, the assessment was whether the three characters of each version had contact with each other in the stories, or instead were described separately from the other characters. The interaction of the characters in each version was classified as ‘hardly if at all’ (i.e. no interaction or very little interactions among story characters), ‘moderate’ (i.e. some interaction among the characters of the stories) or ‘definite’ interaction among characters (i.e. the characters definitely interacted with each other in the story).

All the participants except one of the group with autism, showed ‘moderate’ or ‘definite’ interaction among characters in at least one of the four story-versions. Ten participants with autism and 14 control participants produced at least one story where the characters definitely

interacted with each other. However, six participants with autism and only one control participant produced at least one story where the characters hardly interacted with each other (Fisher's Exact Test, two tailed, $p=.04$).

b) Emotional and Psychological Engagement among characters: The aim here was to explore whether or not the participants told stories that conveyed any 'emotional' and/or 'psychological' engagement among characters. Each version was classified as 'hardly if at all', 'moderate' or 'definite' emotional and/or psychological engagement among characters.

In relation to 'emotional' engagement', the majority of participant in the two groups (13 autistic and 14 control participants) conveyed a 'hardly if at all' emotional engagement among the characters in at least one story-version; and 6 participants with autism and 10 control participants showed 'somewhat' or 'definite' emotional engagement in at least one story-version. Again, only a small number of participants in the two groups (two autistic and four control participants) conveyed a 'definite' emotional engagement among characters.

Similarly to the case with 'emotional' engagement, the majority of participant in the two groups conveyed a 'hardly if at all' psychological engagement in at least one story-version (11 autistic and 10 control participants), although in this case the majority of participants in the two groups also showed either 'somewhat' or 'definite' engagement among characters in at least one story-version (11 autistic and 14 control participants). In this case only four autistic and seven control participants conveyed a 'definite' psychological engagement among the characters of at least one version.

Thus, in the majority of the stories produced by the participants, the characters of the stories did not show any emotional or psychological engagement with each other. However, approximately

half of the participants in the two groups conveyed some emotional engagement among the characters in at least one story-version, and the majority of participants in the two groups conveyed some psychological engagement among the characters in at least one story-version.

3.3.7- Summary of results

One of the main results of this study is the lack of significant differences between the two groups in some aspects of role-taking. For instance, all the participants except two of the group with autism, reached some degree of role-taking, either adopting the role of a character or showing some understanding of different roles among characters (scoring more than 0 on 'adoption of a role') in at least one version. However, few participants in each group produced stories adopting the perspective of the main character in terms of psychological orientation, that is to say, involving thoughts and feelings. In addition, no significant difference was found in co-ordination of story content. Both groups tended to score higher on co-ordination of story content than on perspective taking. Finally, the mental state terms used in the stories were similar in both groups.

In spite of the above similarities, individuals with autism showed role-taking limitations in that they scored significantly lower than the non-autistic participants on the 'overall role-taking', 'perspective taking' and 'change of perspective' scores. They also showed a tendency to score lower on 'adoption of a role' (corresponding with the higher number of participants with autism who did not take the role of a character in at least one version) and 'adoption of a perspective'. Moreover, mental age and overall role-taking were significantly correlated in the control group, but not in the group with autism, suggesting that the developmental mechanisms involved in role-taking might be different for each group of participants.

Participants with autism also showed several similarities with the control participants in relation to the content of their stories. For instance, participants in both groups produced stories concerning similar topics (school, family, robbery, etc), and they related the characters with each other to some degree (although six participants with autism and only one control participant portrayed no interaction among characters in at least one version). The majority of the stories did not convey any psychological or emotional engagement among the characters of the stories. Concerning the degree of engagement among the characters in *at least one* story-version, similar number of participants in both groups conveyed some psychological (approximately half of the participants in each group) or emotional (the majority of participants in each group) engagement.

3.4 Discussion

The majority of participant with autism reached some degree of understanding of different roles of the characters described in their stories. However, the stories they produced showed less elaboration of the characters in relation to their roles and perspectives, than the stories of the control participants. In addition, they showed limitations in shifting from the perspective of one character, to the perspective of another character in the same story.

Significant differences were found between the two groups on perspective-taking, but not in co-ordination of story content. This result confirms the prediction that ‘perspective-taking’ contributes more to group differences than ‘story co-ordination’. This result is compatible with the view that co-ordination of story content might implicate higher cognitive understanding than ‘perspective-taking’, which may require more social and non-inferential role-taking. This result, therefore, is in keeping with the interpersonal theory, although it is not so clear how to explain intact aspects of role-taking by this account.

In addition, the two groups tended to score higher on co-ordination than on perspective taking, suggesting that in this task, the level of difficulty is higher on perspective taking than co-ordination of story content.

One element that needs to be taken into consideration is the interdependence of the role-taking measures. For example, the overall role taking score integrates different measures, which can receive a high score, only after the participant has shown a certain level of understanding on previous measures that require a lower degree of role-taking. For example, if a child scores zero on “Adoption of a role”, he or she could not score more than one on “Adoption of a perspective” and “Change of perspective”. Although the interdependence of these measures influence the distribution of scores, it was decided to follow Feffer’s method in ask to derive composite scores that indeed reflect different stages in role-taking. The results comprise an adequate ordinal set of data to what non-parametric statistics can be applied.

The mental terms used in the stories were similar in both groups. The two groups used ‘desire’, ‘perception’, ‘emotion-behaviour’, ‘emotion’ and ‘cognition’ mental state terms. These results are comparable with the results found by Tager-Flusberg et al. (1995) who reported that individuals with autism use the same number of emotion and related feeling state terms than verbally matched control individuals. These authors were not able to examine the use of cognitive mental state terms because very few participants in each group used them in their study. In the present study, the use of these terms by participants with autism was similar to that of the control group. The impairments in role-taking of the participants with autism, therefore, cannot be explained in terms of a difficulty in understanding mental state terms, as has been suggested by the theory of mind theory. However, this study only examined productivity and not comprehension of mental state terms, and it is plausible that differences might arise with a task of comprehension of mental state term.

Finally, the two groups were also comparable regarding the content of the stories with respect to topic, degree of interaction among characters, and psychological and emotional engagement among the characters of the stories. The participants produced stories about similar topics, for example school, family or robberies, and the characters of their stories were described in interaction with each other. These results suggest that the participants were motivated to produce the stories and to relate the characters of the stories with each other, and, therefore, any differences in role-taking are not explained by those aspects of the story content. However, the majority of those interactions did not convey any psychological or emotional engagement among the characters of the stories, with less than a half of the participants producing interactions rated with a 'definite' psychological and emotional engagement.

There is one interesting incident that comes from the rater's experience. She acknowledged that a few participants told the stories, as if they were actually happening. They were not only taking the role and behaving as if they were the character of the story, they also seemed to think they were the main character of the story. After having rated the stories, when the rater discovered the participants' diagnosis, it was found that these participants were within the group with autism. This recalls the episode described by Loveland and Tunali (1993) from a high functioning male with autism who participated in their study. He seemed to have a lack of awareness that the story that he was retelling was fiction. The authors suggested that this might be an indication of a failure to understand the character's motivations. It is difficult to know why some of these participants appear to have a 'stream-of-consciousness' sense of other people's perspective. It is possible that the lack of differentiation between self and other leads these individuals to not only take the role of another person, but also in some cases to 'become' that person.

Therefore, the results that individuals with autism showed more difficulties in role-taking than in co-ordination of story content vis-à-vis control participants, and that no group differences in terms of content of the stories were found between the two groups, suggest that individuals with autism fail in those aspects that are more dependent on non-inferential role-taking. Moreover, the similarities between the two groups in the type and frequency of mental terms used, suggest that the difficulties of individuals with autism in role-taking in this task cannot be explained by an impairment in conceptual aspects of theory of mind. However, this task does not examine comprehension of mental state terms directly, and therefore it is unclear whether individuals with autism might be limited in their understanding of mental state terms. New studies that include production and comprehension tasks are needed. Moreover, it is unclear whether individuals with autism have difficulties in adopting the perspective of real people instead of story characters. More research is needed in this new area.

One important factor to take into consideration is that the groups of the present study were matched according to chronological age and language ability, as measured by a test of vocabulary comprehension (BPVS), mean length of utterances, and mean number of words per story-version. Such matching procedures mean that this group of participants may not be representative of the whole autistic spectrum. Also, one needs to be cautious about generalising these results to the autistic population as a whole, for reasons of small sample size. However, the two groups were carefully matched and the levels of difficulty of the task were appropriate – there were neither floor nor ceiling effects in either group of participants– suggesting that the task was suitable for examining certain aspects of role-taking. Further studies in this area are needed, with participant samples of greater size.

It is of note that verbal mental age was found to be related to role-taking in the control participants, but not in the participants with autism. One interpretation of this result might be that

individuals with autism use different strategies than non-autistic participants to take the roles, or adopt the perspectives of story characters and, perhaps, of other people. These correlations might also be influenced the wider range of overall role-taking scores found in the non-autistic group than in the group with autism, and therefore their interpretation is tentative.

The results of this study suggest that although individuals with autism appear to have limitations in some aspects of role-taking, they might have some role-taking ability that they can use in some situations. It is possible that they can achieve this role-taking understanding through social capacities that they have intact. For example, the interpersonal interactions elicited when requesting, or when responding to another person's request, might provide the child with autism with some experience about the subjective perspectives of others.

It is also possible that there are aspects of the process of identification that are present in some children with autism. In this way, their understanding of the viewpoints of other people might be influenced by their degree of identifying with them.

To conclude, the present study provides evidence that individuals with autism have limitations in role-taking. More specifically, they seem to have specific difficulties in consistently applying those role-taking aspects that might be more dependent on non-inferential forms of role-taking, as opposed to other aspects that might be more cognitively based.

CHAPTER FOUR

Understanding deictic expressions in Autism: Part one

4.1 Introduction

In this chapter, role-taking will be examined from the viewpoint of 'Deixis'. The term 'Deixis' is the Greek word for pointing or indicating. Deictic expressions are those used to indicate and to locate specific targets. Examples are the linguistic terms *this/that*, *here/there*, *come/go*, *bring/take*, *I/you*, and *before/after*. Non-verbal examples include the gestures of *pointing* and *nodding*. Deictic expressions are anchored in the 'speaker' and therefore shift in dialogue depending on who is speaking. Therefore, one person's *here* is another person's *there*, and so forth. The study of deixis is important because the child's understanding of deictic expressions might depend on both conceptual and non-inferential role-taking. It will be argued that although cognitive factors may play an important part in the development of deictic expressions in young children, non-inferential role-taking that develops through interpersonal engagement also shapes deictic understanding and use.

Deictic expressions can be classified into either verbal or non-verbal. Verbal deictic expressions: are those terms that are used to indicate a place (e.g, *here/there*), a motion (e.g, *come/go*), or moment in time (e.g, *before/after*). Verbal deictic terms also involve personal pronouns, such as *I/You*, that are used as pointers that locate different people in conversations. The 'personal' elements underlying these terms might vary in degree, for example, it is possible that personal pronouns might require a higher degree of role-taking than other deictic terms, such as deictic locatives. Non-verbal deictic expressions (e.g, *pointing*) are used to physically indicate aspects of the world to another person. These expressions can be classified into two main groups according to the goal that one wants to achieve. Non-verbal deictic expression can be used to request things. For example, a child may indicate to someone to fetch a car toy from a high shelf by pointing at it. They may also be used to share things. For example, a child may indicate by pointing to share

the event of an aeroplane flying overhead with another. Non-inferential role-taking may be a mechanism regulating and organizing verbal and non-verbal deictic expressions.

It has been suggested that before a child can use deictic terms correctly, he/she not only needs a representation of a self as an entity distinct from others (Bates, 1990) but also an understanding of different points of view (de Villiers & de Villiers, 1974; Loveland, 1984). Moreover, it has also been suggested (for example by: Charney, 1981, Cox, 1986; Hobson, 2002) that the child comes to comprehend and use deictic expressions by identifying with the person who speaks; that is, by experiencing the other's perspective and attitude and 'moving' into the shoes of the other in relation to an aspect of the world. So, for example, in the case where the adult uses the word 'there' while pointing to a bird, the child integrates and associates the utterance ('there') with the attitude that accompanies the term (the adult's attitude). Thus, the understanding of deictic expressions appears to contain personal elements that allow young children to grasp deictic meaning.

The principal hypothesis of the present study is that individuals with autism, compared with chronological age and verbal mental age matched non-autistic individuals, will show limitations in their production and comprehension of verbal and non-verbal deictic expressions. The rationale here is that because of the difficulty children with autism have in identifying with and 'moving' to the psychological position of the other person, aspects of deictic functioning that rely on non-inferential role-taking will be affected.

In this chapter, the emergence of deixis in typically developing children will be considered, and followed by a review of those few studies that have examined verbal and non-verbal deictic expressions in individuals with autism.

4.2 deixis in typical developing children

Comprehension of deictic expressions involves taking into account different points of view. The understanding of terms such as '*here/there*' requires taking the point of view of the speaker and appreciating that *here* refers to a place near the speaker and *there* to a place far from the speaker (Cox, 1986). The same applies to other deictic terms such as '*this/that*', '*come/go*' or '*bring/take*'.

Let us take the following conversation:

Speaker 1: Could you bring that book?

Speaker 2: Which book?

Speaker 1: That book over there (while pointing)

Speaker 2: Oh this book! Shall I put it over there (while pointing)?

Speaker 1: No, could you put it over there?

This example illustrates how deictic terms are knitted into conversations to focus and orientate the listener to the speaker's perspective. For this interaction to succeed the speaker/listener needs to 'understand' both cognitive and interpersonal aspects of the situation, as in: a) the spatial relation between the speaker, listener and the referent (Fillmore, 1971), b) the non-verbal pointing that helps locate the book (located near speaker2, far from speaker1) and its destination (near speaker1, far from speaker2), and c) the speakers'/listener's psychological orientation (what they may feel, think or intend in that situation).

Thus, understanding of deictic expressions implies taking into account several aspects of a situation. All these different aspects reveal that deixis is "highly context sensitive" (Bruner, 1975. p.69). One aspect of this context is interpersonal non-inferential role-taking. As already stated, Hobson (2002) is one of several commentators to suggest that the child comprehends and uses deictic expressions through identification with the person who speaks. In relation to personal pronouns he states:

“She (the child) recognizes that her mother’s insistent ‘I do it!’ expresses her mother’s attitude, and that her mother’s ‘That’s mine!’ expresses her mother’s claim to possession. So, when the child herself has that attitude, then all she has to do is use the utterance which expresses that attitude for herself.” (p.223).

Thus, according to this view the child moves (with feelings) to the psychological perspective of the other person and *feels* that person’s attitude towards this relevant aspect of the world. Identification, therefore, has been suggested to be important for the understanding of personal pronouns. It seems reasonable to suggest that it is also important for the child’s acquisition of other kinds of deictic expressions, since they also require taking into account the speaker’s perspective. For example, the child may use the word *‘there’* while pointing to a glass of milk. Then, by identifying with the other’s attitude, and using statements such as *‘look over there!’* all by him/herself, will he/she understand the full meaning of deictic expressions. However, it might be the case that this explanation is incorrect, or that the explanation is only partial, in which case an investigation of autism might prove to be revealing in this regard.

One important aspect of these types of deictic expression is that they are often accompanied by a non-verbal deictic gesture, like pointing, for example. The majority of studies designed to study deictic terms have failed to examine the implication of non-verbal gestures in the understanding and use of deixis. Thus, it is unclear to what extent the use of pointing helps young children understand deictic terms.

The use of non-verbal gestures is evident in children during the first year of life. There are two aspects of the pointing and reference that seem to be relevant in the infant’s development of social understanding. The infant not only initiates social episodes by pointing to things and showing them to other people, but also he/she can follow other people’s pointing or gaze. Infants begin following the gaze of others and pointing by the end of the first year of life (Scaife and Bruner, 1975; Trevarthen and Hubley, 1978). The development of these skills was discussed in

Chapter 1, where it was considered how joint attention episodes serve to focus the child and adult on the same object or event. As mentioned, infants use person-person-world episodes to request things and to show things to others. Adults also tend to direct the infant's attention to specific things in a shared world. Non-verbal gestures, such as pointing or nodding, very commonly accompany the infant's and the adult's actions of showing or requesting. Deictic terms, such as 'that' and 'there' are used very frequently by adults and children to refer to common goals, and they mostly appear together with either an explicit pointing or a handling gesture (Wales, 1979). Authors such as Wales (1979) and Shatz (1982) emphasized that children below the age of 24 months use referential gestures as attentional devices to locate things or events. Children need to learn the conventional relation between language and gesture before the latter can be anything more than attentional devices (Shatz, 1982). So children under 24 months are able to comprehend and use non-verbal gestures, which demonstrates their capacity to understand the proximal/non-proximal distinction that is necessary for deictic comprehension. This later becomes manifest in deictic expressions.

Cox (1986), pointed out that children do not learn deictic terms by marking simple associations between the word and the object, nor are they influenced directly by the frequency that adults use these terms. The child needs to have first understood how other people use them and then he/she has to reverse the roles and apply them for herself. Non-verbal gestures are interpersonal expressions that not only direct the child's attention to an object or event, but they also provide the child with the opportunity to move to the psychological and emotional position of another person through non-inferential role-taking.

So it is not that children simply 'learn' the words, they also learn the context within which the words are used, and perhaps, through identification with the other in relation to a shared world. But the competent comprehension and use of deictic expressions is itself an end point in a

developmental process that involves the coming together of different capacities. To examine this 'context', further research designed to look at the emergence of deictic comprehension in typically developing children, and of specific relevance for the present thesis, will now be reviewed.

Clark and Sengul (1978) examined understanding of the deictic terms *here/there* and *this/that* in three groups of children with mean ages of 3;1 years, 3;11 years and 4;11 years of age. In their task the child sat at a table on which were placed two discs as shown in Figure 1. One disc was situated opposite the child next to speaker 2, and the other disc was placed to the child's side next to speaker 1.

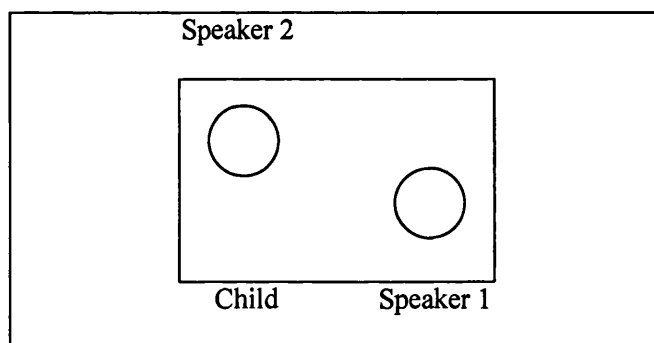


Figure 4.1: Task layout used by Clark and Sengul (1978)

Pairs of similar toy animals were placed on each disc, and the child was asked questions such as, "Make the dog over *here/there* turn around" or, "Make *this/that* chicken hop". In this way, the child's understanding of the deictic terms *here/there* and *this/that* was tested in relation to the animal that the child selected to manipulate. The investigators found that the comprehension of deictic terms improved with age over the period between 3 and 5 years, and that the locative pair *here/there* was mastered before the demonstratives *this/that*. In addition, they found that the youngest children did not contrast these terms and followed a pattern of response. For example,

most of these three years old children choose the animal that was on their own side of the table regardless of the deictic term used in the instructions, while some of the younger children selected the animal closer to the speaker. These authors suggested three stages in the acquisition of these terms: *no contrast*, followed by *partial contrast*, followed by *full contrast*; and that in the acquisition of the deictic contrast, it is critical where children start from and what route they follow. They also suggested that *this/that* terms might be more difficult to understand than *here/there* terms because *this/that* not only refer to a place that is near or far from the speaker, but also to an object that is located in one of these places. Therefore, *this* and *that* include part of the meaning of *here* and *there*.

In another study by Clark (Clark and Garnica, 1974) the older children that participated in this task did successfully discriminate between the deictic terms *come/go* and *bring/take* using the speaker as the point of reference. Four age groups of 11 typically developing children (six, seven, eight and nine years-olds) were given a task in which they were shown three animals: one inside a garden, and two outside the garden as shown in Figure 2.

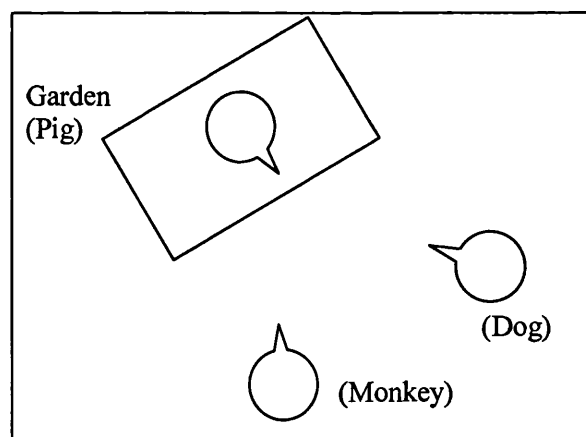


Figure 4.2: Task layout used by Clark and Garnica (1974)

In one trial, for example, the Pig was placed inside the garden, and the Monkey and the dog were placed outside the garden. The child was told: "*the dog says, 'Can I come into the garden?'*" *Which animal is he talking to?*" In this way, the participant had to work out who was either the

speaker or the listener in relation to the deictic term used by the animal that was speaking, which was determined according to the visual-spatial situation of the animals (either inside or outside the garden). The deictic terms 'come', 'go', 'bring' and 'take' were each used in four different situations (two identifying the speaker and two identifying the addressee) over the course of three different sessions. The authors found that overall the verbs 'come' and 'bring' elicited significantly more correct responses than 'go' and 'take' across the different ages. They also found that comprehension of the verbs 'go' and 'take' increased significantly with age. This result was not found with the verbs 'come' and 'bring'. Moreover, it was easier for the participants of all the groups to identify the speaker where the verb was 'go' or 'take', and easier to identify the addressee where the verb was 'come' or 'bring'. The authors suggested that semantic complexity is one of the major determinants of order of acquisition of deictic verbs. They explained this complexity in terms of cognitive strategies that children rely on before they are able to learn the full meaning of deictic verbs (e.g. by selecting always the person or the object at the goal regardless of the term used).

There are limitations to both of Clark's studies. In particular, they only examined for the comprehension of verbal deictic terms and not production. So it is unclear whether the children in the samples would have used deictic terms in the correct contrastive way when they themselves were the point of reference. Further, these studies stressed the cognitive components of deixis, and not the social factors that may also contribute to the learning of these expressions.

Methodologically, it is difficult to distil out those aspects of deixis that are dependent on cognitive understanding (conceptual role-taking) and those aspects that are learned through the child's interpersonal engagement with other people (non-inferential role-taking). One way to examine the social factors involved in deixis is to explore the use and understanding of deictic expressions in children with autism, for whom other evidence points to difficulties in identifying

and engaging with others. In the next section I will consider these ideas and experimental work conducted with children with autism.

4.3- Deixis in autism

There are very few studies that have examined deixis in individuals with autism. Those reviewed here have mainly focused on two specific areas of deixis: a) the understanding and use of personal pronouns, and b) the understanding and use of deictic shift from present to past tense. It has proved difficult to find a study that has examined the deictic expressions, '*here/there*', '*this/that*', '*come/go*' or '*bring/take*' in individuals with autism. Some of the studies that have been conducted will be reviewed in this section.

Whereas typically developing children use and respond to verbal deictic expressions by the end of the first year or the beginning of the second year of life, using co-ordinated non-verbal gestures, individuals with autism have an impairment in the 'sharing' (protodeclaratives), as opposed to the 'requesting' function of these gestures (protoimperatives). This impairment may provide young children with autism with fewer social events in which to experience the use of deictic expressions, but may also indicate that aspects of deixis related to sharing experiences are most critical. In addition, individuals with autism have been found to have difficulties in following other people's gaze, a process that is relevant for understanding deixis. However, responding to gaze and pointing has been found to be related to verbal mental age in individuals with autism (Leekam *et al.* 1998; DiLavore and Lord, 1995; Mundy et al, 1994). For example, Leekam *et al.* (1998) showed that individuals with autism of mental ages above 48 months (but not below this age) were as proficient as non-autistic language matched individuals in following the gaze of other people when being tested in a laboratory. In addition, Mundy et al (1994) found that

children with autism with MA above 20 months were as proficient as control non-autistic individuals in following an experimenter's pointing gesture. What this finding suggests is that there is a developmental effect in these children's responses to an adult's pointing or gaze gesture, and that a certain level of verbal ability is necessary to understand these joint attention expressions. These findings might also suggest that language depends on these joint attention expressions. Nevertheless, first hand reports obtained from the parents of the children of Leekam et al (1998) study suggested that they did have difficulties in following another person's head turn in their everyday lives. What this suggests is that aspects of non-verbal functioning may be 'spared' in children with autism, but only insofar as they become evident in well-structured laboratory tasks.

It is unclear whether individuals with autism use pointing or other non-verbal deictic expressions when using a deictic terms such as '*that*' that may help other people determine the object of reference. Moreover, it is not known whether individuals with autism use these terms in the correct contrastive way (e.g. '*this*' for near and '*that*' for far). More is perhaps known in relation to the use and understanding of personal pronouns in people with autism. In his first description of autism, Kanner (1943) emphasized the abnormal use of personal pronouns in children with autism. He reported that some of his patients, like Charles (described in Chapter 2), repeated personal pronouns just as heard and therefore they ended up referring to themselves as '*You*' and to other people as '*I*'. Some people have explained this deictic error as a form of echolalia where the child repeats exactly what is heard due to a lack of linguistic comprehension (Bartak and Rutter, 1974), rather than a reflection of their difficulty in differentiating self and other- although multiple impairments in cognition and social functioning may play a role (Fay, 1979).

However, it is not the clearly case that the individuals with autism have obvious difficulties with personal pronouns. Current research suggests that pronoun reversal errors are not as common as

previously reported in children with autism. For example, Tager-Flusberg (1989) evidenced reversal errors of pronoun use in only 12% of instances of pronoun use. Thus, this would seem to indicate that pronoun errors are evident but not pervasive.

Jordan (1989) examined the understanding of the personal pronouns 'you' and 'me', both from the listener's and the speaker's viewpoint, in a group of 11 autistic children (aged 6 yrs 8 mo to 16 yrs 5 mo), who were compared with 11 normally developing children (aged 2 yrs 5 mo to 9 yrs 6 mo) and 11 mentally handicapped children (aged 14 yrs 6 mo to 19 yrs). The participants were matched by receptive vocabulary age (according to the EPVT). The participant sat next to the experimenter at a table with objects. All participants had previously demonstrated their understanding of the object labels in a play situation. To examine the comprehension of 'you' and 'me' from the listener's point of view, the participants were given instructions such as *'Put the hat/badge on to you/me'* or *'Push the car near 'you/me''*. Under this context, the only reference for the pronouns was either the experimenter (the speaker) or the child (the addressee). To examine the speaker's contrast, the participants were asked questions such as *'Who's got the hat?'* or *'Look! The spider's landed on....?'*. Regarding the listener contrast, all groups showed proficient comprehension of the personal pronouns 'you' as applying to themselves, and 'me' as applying to the speaker. However, in relation to the speaker's contrast, it was found that the participants with autism used more proper names or incorrect pronouns, than the comparison groups. The author said: *"a difficulty with the deictic use of pronouns can explain why the autistic children have such a high rate of error in production and why the majority fail to produce either pronoun at all, while showing excellent comprehension of these same pronouns"* (p.176). She concluded that the difficulties found in individuals with autism in using personal pronouns might relate to differences in social behaviour, like their low propensity to engage in joint attention routines. Such social routines may underlie many pragmatic aspects of language development, like for instance deixis.

The results of the above study are consistent with Lee, Hobson & Chiat (1994) who compared 25 participants with autism with 25 CA and VMA matched non-autistic individuals, on a series of tasks to test the comprehension and production of the personal pronouns 'I' and 'You'. For example, in one task the participants were presented with a cardboard sheet with two different drawings of familiar objects on each side (e.g. a cat on one side and dog on the other side). The card was positioned between the participants and the experimenter so that the participant could see one drawing and the experimenter could see the other drawing. After establishing that the participants knew what was on each side, they asked questions such as, '*Who sees the cat?*' or '*Who sees the dog?*'. To test for production the same materials were used, but this time the participants were asked '*What can You/I see?*' This experiment also included a control task to control for task demands, where the same question was put to the participants, but the pronoun was substituted for the child's name/E's name. The results of this tightly controlled task demonstrated that the participants with autism were as proficient as their matched control participants in the comprehension of the pronouns 'I' and 'You', and very few participants showed pronoun reversal errors. However, the group with autism showed a relative propensity to use the pronoun 'I' (as in '*I see it*') rather than '*me*', and those of lower ability tended to use proper names for themselves and the experimenter instead of '*me*' and '*you*'.

Interestingly, and in accordance with Leekam et al. (1998), the teachers were asked about pronoun difficulties in the sample. They reported abnormal use of personal pronouns in the majority of their pupils with autism (17/25). Also the authors reported a very striking episode: one of the participants with autism who had performed perfectly throughout the personal pronoun task, turned to leave and said, '*Thank you for seeing you, Tony*'. The authors suggested that the abnormalities of individuals with autism in the use of personal pronouns '*might be reflected in unusual patterns of usage, rather than in incorrect use*' (p.172). One possible explanation of this

unusual pattern of usage is that the anchorage of self-experience may not be as secure for autistic as for non-autistic individuals. On the other hand there is also the possibility that *'more able autistic subjects might have learned conventional patterns of pronoun usage by abnormal cognitively mediated compensatory strategies rather than by normal process of acquisition'* (Lee et al. 1994, p172).

Another area of deixis that has been examined in individuals with autism is the inability to shift verbs from present to past tense. Bartolucci and Albers (1974) presented three participants with autism (Chronological Ages: 11.06, 7.06 and 6.0 years, and Mental Ages: 5.04, 3.10 and 5.04 years respectively) different actions with pictures and toys where, for example, a girl was drinking juice. They were then asked questions such as: *'Ann is drinking the juice. She did the same thing this morning. What did she do?'* So in this example the authors examined whether the children would transfer the word drink (present) into drunk (past). Alternatively the child was presented verbally or in writing with an incomplete sentence, such as *'Yesterday Ann --- the juice'*, and then the participant was asked to finish the sentence. The participants' performance was compared that of three non-autistic participants (Chronological Ages: 10.06, 10.0 and 9.06 years, and Mental Ages: 4.05, 3.08 and 4.03 years respectively), who had a mental age slightly higher than the group with autism. The authors found that the participants with autism did significantly less well than the control participants in the production of past tense. They concluded that the children with autism *"show evidence of a problem, at the level of the relationship between the morphological and the semantic aspects of language in the area of past tense"* (p.140). By this the authors mean that the deictic problem with past tense in individuals with autism, stems from a cognitive impairment in language to make connections between different aspects of language, and in particular, in the development of cognitively mediated syntactic structures that relate to deixis. However, this conclusion needs to be considered cautiously due to the small samples used in this study. More research is needed in this respect.

From the review of the literature, it is unclear whether or not individuals with autism have a specific impairment in their capacity to comprehend and use deixis. It has been suggested that individuals with autism may draw more heavily on alternative cognitive processes that contribute to this capacity and that in certain structured situations this enables them to succeed in their use and understanding of **personal pronouns** deictic term. The limitations of individuals with autism may lie in more subtle qualitative responses that may, in the typical case, be more interpersonally mediated.

The aim of the present study was to extend the scope of the previous studies by examining the performance of individuals with autism in a set of tasks that tested the production and comprehension of the deictic terms '*here/there*', '*this/that*', '*come/go*' and '*bring/take*'. The use of these types of verbal deictic terms has not yet been examined in individuals with autism. In addition, the present study was designed to examine not only the performance of individuals with autism with regard to verbal deictic terms, but also the relationship between these linguistic terms and the non-verbal deictic expressions that often accompany them.

4.4 deixis in autism: An experimental investigation.

The aim of this study was two-fold. Firstly, it was necessary to design a task to elicit both verbal and non-verbal deictic expressions without using any deictic expression in the instructions. Secondly, the aim was to design a set of comprehension tasks where both non-verbal and verbal deictic expressions were used in the instructions, that could be compared with well structured control conditions to ensure that any failure in the performance of the task was due to a lack of

understanding of both verbal and non-verbal deictic expressions, and not due to other task related factors.

4.4.1- Hypothesis

The hypothesis behind this set of studies, designed to examine deixis in children with autism, is that the correct use and understanding of deictic expressions (both verbal and non-verbal) relies on the capacity of the child to identify with other people, and that the capacity of people with autism to identify and adopt the psychological perspectives of other people is limited (e.g. Lee *et al.* 1994; Hobson and Lee, 1999). If the production and comprehension of deixis depends in some respects on these processes, then it was reasonable to predict that people with autism were likely to be limited in their use and understanding of deictic expressions.

The present set of studies aimed to test the prediction that individuals with autism, compared with matched non-autistic individuals, would show different responses in the production and comprehension of verbal and non-verbal deictic expressions (such as here/there, come/go, this/that, or non-verbal head nods indicating a position in relation to the person nodding). More precise predictions will be detailed as part of the methodology of the individual studies.

Four separate experiments were conducted to study production and comprehension of deictic expressions in individuals with autism. The first experiment was designed to examine production, while the remaining three were designed to test comprehension.

4.4.2- Participants

The participants in this set of studies were 20 young people with autism and 20 without autism but with mental retardation. All the participants came from special education schools for children with special needs. The participants with autism were diagnosed using the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV: American Psychiatric Association, 1994- See Appendix 1) for autism. The main investigator observed the participants in different situations in their schools and the information obtained was checked with their teachers. The participants with autism also met diagnostic criteria on the Childhood Autism Rating Scale (CARS: Schopler,E. *et al.* 1986- See Appendix 2).

The two groups were closely matched for chronological age and verbal mental ability (see Table 4.1). Verbal mental ability was estimated using the British Picture Vocabulary Scale (BPVS: Dunn *et al.* 1982).

	Chronological age Mean/ SD/ range (yr;mo)	Verbal mental age mean / range (yr;mo)
Autistic Group n = 20	10;11 SD: 2;10 (5;09-14;09)	5;09 SD: 2;04 (3;01-12;05)
Control Group n = 20	10;10 SD: 1;09 (7;03-13;05)	6;00 SD: 2;06 (3;04-12;03)

Table 4.1 Deixis study: Participant characteristic

4.4.3- Administration of tasks.

All four experiments were presented with a fixed order across two testing sessions. The test of production (Experiment 1) was always administered first so that the spontaneous responses of the

children were not prompted by the comprehension tasks that followed. After this experiment, Experiment 2 was administered. This experiment examined the comprehension of the deictic verbs 'come' and 'bring'. The next experiment to be administered was Experiment 3, which was designed to examine comprehension of verbal deictic expressions and non-verbal deictic expressions. This testing session took between 15 and 30 minutes to administer.

The second testing session comprised the final comprehension task (Experiment 4). This task was based on an earlier study by Clark and Garnica (1974), where comprehension of the deictic terms 'come/go' and 'bring/take' was assessed. This lengthy task was administered approximately one week after the first testing session, to ensure that the participants' performance was not affected by fatigue.

The design and method of the Experiment 1 will now be considered in some detail. Experiments 2, 3 and 4 will be detailed in the following chapter.

4.5 Experiment 1: Production of verbal and non-verbal deictic expressions in autism.

This task was designed to study the use of verbal and non-verbal deictic expressions in individuals with autism.

4.5.1- Predictions

The following predictions were made about autistic children's performance relative to the matched control group:

When prompted to communicate with someone about spatially located events, participants with autism will be less likely to use deictic gestures to communicate than will the control participants.

This would be evidenced by:

- a) Less use of both verbal and non-verbal deictic gestures.
- b) Less co-ordinated episodes that include a 'verbal deictic' gesture *and* a 'nonverbal deictic' gesture.
- c) more 'atypical' verbal deictic expressions, by which is meant the use of a term that refers to a near location, but it is used to refer to a distant location, and the opposite.

4.5 Experiment 1: Production of verbal and non-verbal deictic

Expressions in action.

two white plastic fields (see Figure 1) and two white plastic

This task was designed to study the use of verbal and non-verbal deictic expressions in

4.5.1. Procedure

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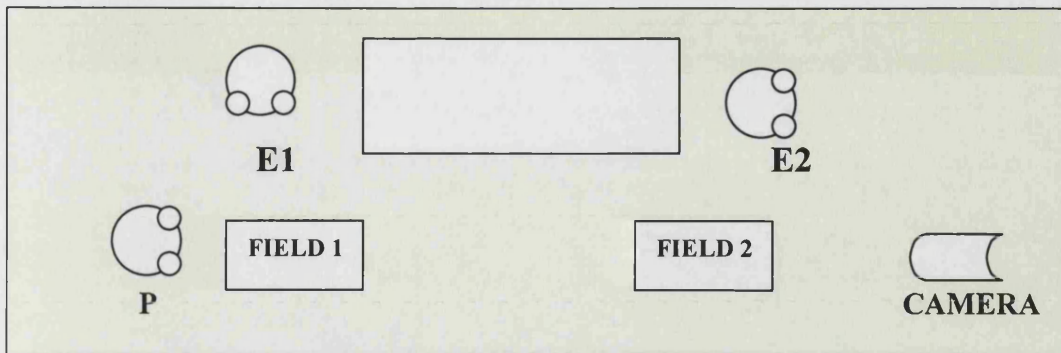


Figure 4.3 Deixis Experiment 1: task layout

The material was introduced to the participant with one experimenter (E1) giving the following instructions:

" We are going to play a game together with some animals and two fields. First of all, let's see what animals we have. What do you call this animal?... and what colour is this field? "

After having checked that the participant could name all the animals and established that the two fields were white, the participant was asked to put a field on each of the two chairs. Experimenter 1 (E1) gave the instructions to the participant, experimenter 2 (E2) stood facing the participant (P) on the other side of the room. Once the participant had placed the fields on the chairs E1 said:

"Some of the animals live in one field (E1 stood by the field and without pointing, indicated the field by touching it) and some of the animals live in the other field (E1 stood by the field and without pointing indicated the field by touching it). We want you to help us put the right animals in the right fields. We'll tell you, (participant's name), what to do."

Then the participant was asked to sit on the chair set aside for him/her, facing Field 1. E1 asked E2 to turn around as follows:

" Tony (E2) turns around and I will tell you what to do ".
While holding one of the plastic animals E1 said:

" Tell Tony to put – (E1 showed the animal to the participant) – in – (E1 briefly placed the animal in one of the two fields and then she put it back on the table) ".

In the production task it was important not to contaminate the participant's responses by using deictic terms in the instructions given to him/her. Due to the difficulty of finding a non-deictic word that could be substituted for the deictic terms in the instructions, the participant was shown what to do. Then E1 put the animal back on the table and asked E2 to turn around to face the participant. During the response period E2 waited for the participant to spontaneously instruct him on what to do. If the participant did not instruct E2, or the participant's instructions were not clear, E2 would then prompt the participant. In those cases where the participant indicated the animal to pick up but did not indicate which field, E2 said to the participant: "*Which field?*", and he would continue prompting until the participant's instructions were clear. In those cases where the participant did not respond at all after 3 seconds approximately, E2 said: "*Tell me what to do*".

This procedure was performed with six different animals. The fields in which the animals were to be placed were varied, such that three instructions were directed to the field closest to P and three to the field furthest from P. Thus, the instructions for proximity and distance had the same number of trials. Table 4.2 shows the fixed order of the questions, which all the participants received, indicating the different fields. The instructions were arranged with systematically changing, but not rigidly alternating reference to the 'near' and 'far' fields.

TRIALS	E1'S INSTRUCTIONS
1	<i>Tell Tony to put (the cow) in (FAR field).</i>
2	Tell Tony to put (the dog) in (NEAR field).
3	<i>Tell Tony to put (the sheep) in (NEAR field).</i>
4	<i>Tell Tony to put (the goat) in (FAR field).</i>
5	<i>Tell Tony to put (the pig) in (FAR field).</i>
6	<i>Tell Tony to put (the horse) in (NEAR field).</i>

Table 4.2 Deixis Experiment 1: instructions

Participants were expected to remain seated and give instructions to E2. However, if a participant did stand up and physically demonstrate where E2 should put the animal, this was permitted. Indeed, it was possible that those participants who physically enacted instructions to E2, were the very ones who experienced difficulties with deictic expressions. In the event of a child standing up, the procedure (the six trials) was repeated, and E1 asked the participant to remain seated when giving the instructions to E2. This happened in four cases in each group.

The task was designed to prompt the participants to communicate to E2 and to use a deictic expression. The two fields were identical in shape, size and colour. This put the participants in the position of having to use a deictic expression (either verbal or non-verbal) to indicate one of the two fields.

4.5.3- Scoring and Reliability

Each trial was coded from the videotape in the following four measures:

Verbal Deictic Score: in each trial, a score of 1 was given if the participant used a verbal deictic term (VD). Thus, the total VD score ranged from 0 to 6.

Non-Verbal Deictic Score: in each trial, a score of 1 was given if the participant used a non-verbal deictic expression (NVD). The use of pointing was the non-verbal expression that received a score here. Thus, the total NVD score ranged from 0 to 6.

Co-ordinated Deictic Expressions: in each trial, a score of 1 was given if the participant used a verbal deictic expression (VD) together with a non-verbal deictic expression (NVD). These episodes were considered co-ordinated deictic expressions.

'Atypical' deictic use: A score of 1 was given if the participant responded with a deictic term that was not typical. Table 4.3 shows the VD terms that were rated as 'atypical'.

IN RELATION TO FIELD 1 (I.E. CLOSE TO P)		IN RELATION TO FIELD 2 (I.E. CLOSE TO E2)	
'TYPICAL' TERM	'ATYPICAL' TERM	'TYPICAL' TERM	'ATYPICAL' TERM
This	That	That	This
Here	There	There	Here

Table 4.3 Deixis Experiment 1: 'atypical' deictic use

The principal rater was not blind to the hypothesis of the study, nor each participant's diagnostic group. For reliability purposes a second rater blind to both the hypothesis and diagnosis of the participants rated 25% of videotaped material (i.e. 10 participants, of which five were randomly selected from each group). The degree of agreement was calculated using the Kappa coefficient statistic, which takes into account the likelihood of chance agreement between the raters. The Kappa coefficient for the participants' use of pointing when instructing was 0.73, indicating '*substantial agreement*' (Landis and Koch, 1977; See Appendix 4). Reliabilities were not calculated for the participants' use of verbal expressions because the categorization of the verbal terms used were explicit and did not require two judgements.

4.5.4- Results of Experiment 1

In this task, all participants were given the greatest opportunity to use a deictic gesture. Thus, if the participants did not spontaneously give the experimenter (E2) an instruction, or gave incomplete or unclear instructions, they were prompted by E2 who asked one more time, "*Which field?*" or "*Tell me what to do*". It was predicted that participants with autism would use fewer deictic expressions compared with the control group.

1- Verbal Deictic Score:

On examining the participants' use of VD across the six trials, there was not a significant difference between the two groups (Mann-Whitney T test, $U = 192$, one tailed, ns). In fact, the distribution of the participants across the VD scores was very similar in the two groups, as shown in Table 4.4. Here, it can be seen that at least half of the participants in each group used a VD term (13 participants with autism and 10 control participants), in at least five trials.

Number of trials:	0	1	2	3	4	5	6
Autistic group n = 20		1	1	4	1	6	7
Control group n = 20	3	1	1	3	2		10

Table 4.4 Deixis Experiment 1: Number of participants using verbal deictic terms

2- Non-Verbal Deictic Score:

When examining the participants' use of NVD across the six trials no significant differences were found between the two groups (Mann-Whitney Test, $U = 192.5$, one tailed, ns). Once again, the distribution of the participants across the NVD scores was remarkably similar between the two groups, as shown in Table 4.5. Here, it can be seen that the majority of participants in each group used a NVD term (19 participants with autism and 16 control participants), in at least five trials.

Number of trials:	0	1	2	3	4	5	6
Autistic group n = 20				1		5	14
Control group n = 20				1	3	2	14

Table 4.5 Deixis Experiment 1: Number of participants using non-verbal deictic terms

3- Co-ordinated Deictic Expressions:

The number of trials where the participants used a VD term together with a pointing (NVD) were examined (See Table 4.6). No significant differences were found between the two groups in this case (Mann-Whitney Test, $U = 186.5$, two tailed, ns). Then, those participants who coordinated a VD term with a pointing (NVD) in at least five trials were considered. In this case, there were 11 participants with autism and eight control participants.

Number of trials:	0	1	2	3	4	5	6
Autistic group n = 20		1	2	4	2	6	5
Control group n = 20	3	1	1	4	3		8

Table 4.6 Deixis Experiment 1: Number of Ps using ‘co-ordinated deictic expressions’

4- “Atypical” deictic use:

Across the six trials, 20 participants with autism and 17 control participants used a VD term at least once. It is this sub-sample that is considered here. In the participants’ instructions to E2, 15 out of 20 autistic participants, and 12 out of 17 control participants used an ‘atypical’ deictic term at least once. The total number of ‘unusual’ atypical terms was 31 in the group with autism, and 26 in the control group.

- a) *The ‘near’ field:* In relation to responses directed to the participant’s closest field, 11 participants with autism and 12 control participants used an ‘atypical’ VD term at least once. Here, the participants with autism used a total of 19 ‘atypical’ terms, and the

control participants used a total of 26 'atypical' terms directed to the closest field respectively. The 'atypical' terms used by these participants were the terms '*there*' and '*that*'.

- b) *The 'far' field*: In this case, there were significantly more participants with autism who used an 'atypical' VD terms at least once when they directed their instructions to the distant field, in that 8 participants with autism and but not a single control participant used the terms '*here*' or '*this*', instead of '*there*' or '*that*', when referring to the far field (Fisher's Exact Test, two tailed, $p=0.004$). These eight participants used '*here*' or '*this*' for the distant location a total number of 12 times.

4.5.5- Further observations

Further observations were made in relation to a) the children's initial responses prior to prompting, and b) 'atypical' deictic use with regard to the first trials, which was directed to the 'far' field.

1- Children's initial responses prior to prompting:

The results this far have concerned the deictic use after the participants had been instructed by E2 and, when necessary, were prompted to give a response. It is also of interest to examine the participants' spontaneous responses after E2 turned around, and before a prompt.

When the experimenter turned around and faced the participant, nine participants with autism but not a single control participant failed to give spontaneous instructions to the experimenter in at least one trial. Out of these nine participants, only one participant did not give any spontaneous

instruction across all the six trials, and seven participants gave spontaneous instructions in four or five trials. Thus, the majority of the participants in the two groups gave a spontaneous instruction to the experimenter in at least four out of the six trials.

Within those participants who gave spontaneous instructions to the experimenter, 10 participants with autism and 12 control participants gave unclear instructions in at least one trial, and required a prompt. Out of these participants, only four participants with autism and two control participants required a prompt in three or more trials. Once again, the two groups were very similar in this respect.

a) Verbal Deictic Score (responses prior to prompt):

When examining the participants' spontaneous use of VD across the six trials no significant differences were found between the two groups (Mann-Whitney, $U=168$, one tailed, ns). The two groups gave similar responses. For example, four participants in each group did not use any verbal deictic term across the six trials, and 11 participants in each group used a VD term in at least four trials.

b) Non-Verbal Deictic Score (responses prior to prompt):

When examining the number of *episodes* of spontaneous pointing across the six trials significant differences were found between the two groups (Mann-Whitney Test, $U=126.5$, one tailed, $p<.02$). However, when looking at the number of *participants* who used pointing spontaneously across the six trials (See Table 4.7) the difference between the two groups was not marked. Here, it can be seen that although a majority of control participants used pointing in all the six trials (12

participants), 14 participants with autism and 16 control participants used pointing in four or more trials.

Number of trials:	0	1	2	3	4	5	6
Autistic group n = 20	1	2	2	1	5	4	5
Control group n = 20			1	3	2	2	12

Table 4.7 Deixis Experiment 1: Number of Ps using NVD expressions spontaneously

c) Co-ordinated Deictic Expressions (responses prior to prompt):

The number of trials where the participants used a VD term together with a pointing (NVD) was examined. No significant differences were found between the two groups in this case (Mann-Whitney Test, $U = 158.5$, two tailed, ns). The two groups gave similar number of co-ordinated deictic expressions, for example, there were 10 participants with autism and 11 control participants who showed a co-ordinated deictic expression in at least four trials.

2- 'Atypical' Deictic use (first trial):

The first trial of the task was directed to the 'far' field. By examining the participants' use of atypical terms in the first trial, it was established whether the participants with autism used the terms 'here' or 'this' 'atypically' without being contaminated by the following trials that were directed to the 'near' field.

During the first trial 14 participants in each group used a deictic expression to locate the 'far' field. Five participants with autism used an 'atypical' deictic term (either '*here*' or '*this*'). Thus, it is considered unlikely that the participants with autism used these atypical terms across the six trials due to perseveration in their response.

4.6 Summary of findings and discussion

The principal result of this study is that participants with autism were closely similar to those without autism in using verbal and non-verbal deictic expressions. In addition, no significant differences were found between the two groups in the number of participants who used co-ordinated deictic expressions (using a verbal deictic term and pointing at the same time).

There was, however, one significant group difference. Only among the children with autism (8 out of 20) were there instances where the terms '*here*' and '*this*' (instead of '*there*' and '*that*') were used to indicate the 'far' field.

These results suggest that participants with autism were more proficient in their use of deictic expressions than was expected. Most of the results were not in accordance with predictions derived from the interpersonal theory. One possible explanation is that there might be both cognitive and social abilities that are intact in individuals with autism, and these might be sufficient to achieve deixis, at least at a productive level. For example, it is possible that their intact visual-spatial perspective taking ability might play a role in their understanding about the anchorage of deictic expressions in themselves and other people. It is also possible that their ability to respond to and use joint attention to request for things, might elicit interpersonal

experiences that may provide young children with autism with some information about different perspectives in other people, an information that might prove useful in the acquisition of deixis.

On the other hand, autistic children's atypical use of the terms 'here' and 'this' to indicate things far away from the speaker, might suggest that some individuals with autism are less firmly 'anchored' in a person-centred stance than children without autism. One person's 'here' and 'this' can be another person's 'there' and 'that', and if a child does not anchor and take the perspective of the other person, then this might result in a difficulty in differentiating the correct contrastive use of deictic terms. Thus, it is possible that the lack of identification with other people might affect some, and subtle, aspects of the use of deictic expression in some individuals with autism.

Another possible interpretation comes from the theory of mind theory. It is possible that in order to understand that the terms 'this' and 'here' only refer to a near location to the speaker, one needs to see how other people use these terms before using them correctly. An understanding of the psychological perspective of other people might be an important factor in understanding how other people use these terms. Thus, individuals with autism might see that other people use the terms 'this' and 'here' to refer to things that are close to them but far from the child with autism, and therefore when the child with autism refers to things that are distant he/she might use these terms too.

Thus, Experiment 1 suggests that individuals with autism are more proficient in their use of deictic expression than had been predicted, although they seem to have some subtle limitations in their use of these expressions, specifically, in the use of 'there' and 'that' to refer to a location that is distant from them .

It is unclear whether individuals with autism use deictic expressions efficiently in natural situations. It is also unclear whether their understanding of deictic expressions is limited. The next chapter will examine comprehension of verbal and non-verbal deictic expressions and will end with a review and discussion of the findings of chapter 4 and 5.

CHAPTER FIVE

Understanding deictic expressions in Autism: Part two

5.1 Introduction

In Chapter 4 the production of deictic expressions was examined in children with autism and matched non-autistic children. The present chapter will consider the comprehension of deictic expressions in individuals with autism, as investigated through three experiments. Experiment 2 was designed to examine the comprehension of the deictic terms ‘come’ and ‘bring’. Experiment 3 was designed to examine verbal and non-verbal deictic expressions in individuals with autism. Finally, Experiment 4 was designed to examine comprehension of the verbal deictic terms ‘come/go’ and ‘bring/take’ in these children by administering a version of the Clark study (1974) that included a novel control condition.

5.2 Experiment 2: comprehension of ‘come’ and ‘bring’ in autism.

This experiment was designed to examine the comprehension of the deictic verbs ‘come’ and ‘bring’ in individuals with autism. These terms involve a movement to the speaker and they have been reported to be easier to understand than the deictic verbs ‘go’ and ‘take’ which involve a movement away from the speaker (Clark and Garnica, 1974).

5.2.1- Participants

The participants who took part in this experiment were the same 20 participants with autism and 20 participants without autism that were described in Chapter 4 and who took part in Experiment

1. The participants with autism were diagnosed using the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV: American Psychiatric Association, 1994- See Appendix 1) for autism, and also met diagnostic criteria on the Childhood Autism Rating Scale (CARS: Schopler, E. *et al.* 1986- See Appendix 2). The participants of the two groups were closely matched according to chronological age (See Table 4.1) and verbal mental age. The participants with autism had a mean chronological age of 10 years and 11 months and mental ability, and a mean verbal mental age of 5 years and 9 months. The control participants had a mean chronological age of 10 years and 10 months and mental ability, and a mean verbal mental age of 6 years.

5.2.2- Predictions

The terms 'come' and 'bring' not only refer to proximity to the speaker but also involve a movement towards the speaker. So in order to understand 'come' and 'bring' one needs to know that the location of the goal is to the direction of the speaker. Clark and Garnica (1974) found that young children understand earlier those deictic terms that involve a movement towards the speaker than those which involve a movement from the speaker. It is for this reason that it was predicted that the terms 'come' and 'bring' might be understood even when a person uses them without a non-verbal prompt (e.g. a point or a nod with the head). It was predicted that the participants with autism would find it more difficult than the control participants to understand such terms. This difficulty might be reflected not only in the fewer number of correct responses given by the participants with autism, but also in the pattern of their responses (requiring more non-deictic prompts).

5.2.3- Method

Experiment 2 was designed to examine the comprehension of the deictic verbs ‘come’ and ‘bring’ when they were used without a non-verbal deictic expression like a nod or a pointing. This experiment was administered after Experiment 1.

The layout of the material was similar to that of the production test (See Figure 4.3). Two plastic fields were placed on two chairs approximately 150 centimetres apart. A set of plastic animals was placed on a table situated to one side in between the fields. In this task, one of the white fields was replaced by a brown field. Although for the purposes of the experiment this was not necessary, having these two coloured fields prepared the participants for the next experiment. In this experiment, the participant was asked to stand by the animals while the two experimenters sat on the chairs. The position of the camera was changed to the centre of the room, with the aim of capturing the whole scene from one side for later scoring, as shown in picture 5.1.



Picture 5.1 Deixis Experiment 2: Task layout

In order to test understanding of the deictic verbs ‘come’ and ‘bring’, the participants were asked to put one of the animals in the field closest to the experimenter who gave instructions such as ‘*Find the sheep and bring it*’ or ‘*Find a horse and come with it*’. The experimenters took it in turn to give a total of four instructions as shown in Table 5.1. Each experimenter used the term ‘bring’ or ‘come’ once across the four instruction, and the two terms were alternately presented.

E1’S INSTRUCTIONS (Brown Field)	E2’S INSTRUCTIONS (White Field)
1- Find the sheep and BRING it. <i>Instruction 2:</i> BRING the sheep. <i>Follow-up:</i> Put the sheep in the BROWN field	2- Find a horse and COME with it. <i>Instruction 2:</i> COME with a horse. <i>Follow-up:</i> Put a horse in the WHITE field
3- Find a pig and COME with it. <i>Instruction 2:</i> COME with a pig. <i>Follow-up:</i> Put a pig in the BROWN field	4- Find the Sheep and BRING it. <i>Instruction 2:</i> BRING the Sheep. <i>Follow-up:</i> Put the Sheep in the WHITE field

Table 5.1 Deixis Experiment 2: ‘come-bring’ task instructions

If the participants did not respond by putting an animal inside a field after the first instruction the instruction was repeated. Since the majority of participants were expected to have at least picked-up the animal after the first instruction, the repeated instruction was changed to the simplest form linking the animals with the deictic term, for example, ‘*Bring the sheep*’.

Finally, if the participants did not respond after the repetition of the instruction (instruction 2), he/she would be given a final follow-up instruction in which the colours of the fields, for example, ‘*Put the pig in the brown field*’, replaced the function of the deictic term.

5.2.4- Scoring

Responses were classified according to: which plastic field the animal was placed into after the deictic instructions, and whether correct or incorrect.

5.2.5- Results

a) 'Screening' condition:

The number of correct responses that the participants gave after the *follow-up* instructions (where the colours of the fields were used instead of deictic terms) was examined, with the purpose of establishing that those participants who did not respond during the deictic trials, understood the basic requirements of the task.

Table 5.2 shows the participants who responded after the follow-up instruction across the four trials. It can be seen from this table, for example, that three participants with autism and six control participants required a follow-up instruction in the four trials. All these participants who responded after the follow-up instruction gave correct responses.

NUMBER OF RESPONSES:	0	1	2	3	4
Autistic n = 20	5	11	1		3
Control n = 20	11	1	2		6

Table 5.2 Deixis Experiment 2: Number of Ps responding after *follow-up* instructions

b) Deictic condition:

The number of correct responses that the participants gave after the deictic instructions was examined.

When examining the total number of responses across participants no significant differences were found between the two groups (Mann-Whitney Test, $U = 161$, one tailed, ns). However, when examining the number of participants who gave a correct response in all four trials, significant differences were found between the two groups. Table 5.3 shows the number of participants who gave a correct response. Here, it can be observed that only two participants with autism, compared with 11 control participants, gave a correct response in all four trials (Fisher's exact test, one tailed, $p = .003$). However, when examining those participants who responded correctly in three or more trials no differences were found between the two groups, in that 14 participants with autism and 12 control participants gave correct responses.

NUMBER OF CORRECT RESPONSES:	0	1	2	3	4
Autistic n = 20	3		3	12	2
Control n = 20	6		2	1	11

Table 5.3 Deixis Experiment 2: Number of Ps responding *correctly* after deictic instructions

In addition, those participants who responded during the deictic instructions, and gave an incorrect response were examined. In this case, there were only three participants with autism who responded after the deictic instructions in the four trials, and who gave an incorrect response in either one or two trials.

5.2.6- Summary of Experiment 2 results

The results of this experiment shows that there were significantly fewer participants with autism than control participants giving correct responses, across the four trials of the task. However, it is difficult to know whether this lower propensity to give a correct response across the four trials of the task is due to a difficulty in understanding deictic terms, in as much as the majority of participants with autism gave correct responses in three out of the four trials. Therefore, it is not possible to interpret the results of this experiment with confidence.

5.3 Experiment 3: comprehension of verbal and nonverbal deictic expressions in autism.

This Experiment was designed to examine comprehension of verbal and non-verbal deictic expressions.

5.3.1- Participants

A non-deictic task was used as a screening test to select those participants who demonstrated a capacity to deal with the task demands. Those participants who gave five or more, out of eight, correct spontaneous responses during the screening task were selected. Using this criterion it was assumed that the participants who responded correctly in five of the eight trials understood the task. This approach was justified by estimates of the probability that the participants responded correctly by chance in at least five trials. The binomial distribution showed that the probability was approximately two out of one hundred, which suggest a low probability to achieve this by

chance. As a result of this screening, ten participants with autism and five control participants were excluded from the analysis. The remaining participants remained closely matched according to language ability (See Table 5.4).

	Chronological age mean / sd / range (yr;mo)	Verbal mental age mean / sd/ range (yr;mo)
Autistic Group N = 10	12;04 SD: 23.31 (8;02-14;09)	6;10 SD: 30;45 (4;03-12;05)
Control Group N = 15	11;00 SD: 17.63 (8;09-13;05)	6;07 SD: 30;46 (3;04-12;03)

Table 5.4 Deixis Experiment 3: Participant characteristics

5.3.2- Predictions

The prediction of Experiment 3 was based on the hypothesis of the study that individuals with autism would be restricted in some aspects of their understanding of deictic expression because of their limited social capacities. It was predicted that relative to control participants, those with autism would give fewer correct responses in the tests of deixis (verbal and non-verbal).

5.3.3- Method

This test examined separately the participant's understanding of verbal deictic and non-verbal deictic expressions. The layout of the material was similar to that of the Experiment 2 (See Picture 5.1).

In this experiment, two coloured fields (one white and one brown) were positioned on the two chairs and the plastic animals were set out on the table. The reason for having two different

coloured fields was that the colours of the fields could be used to differentiate the fields instead of the deictic expressions in a screening task. In this experiment, the participant was asked to stand by the animals while the two experimenters sat on the chairs. The task for the participant was to put two animals into either one or the two fields, based on instructions from the two experimenters.

In the previous experiment (Experiment 2), E1 had introduced a further ten plastic animals to the participant (three horses, two ducks, two pigs, one cow and two sheep) and a white field had been replaced by a brown field. Thus, the participants were already familiar with the animals, colours and position of the fields and the aim of the task (i.e. to put animals inside the fields). The participants were instructed by the two experimenters who took turns. They were asked to take two animals, and in some cases to put them each into a different field, and in other cases to put the two animals into the same field. This procedure reduced the probability of the participant succeeding by chance if one animal was used at a time, and to increase memory load. The colours of the fields were used instead of verbal deictic terms during the non-deictic trials of the screening test. Those participants who did not give a response after the first instructions were given a follow-up instruction using the colours of the fields in order to end the task with a response.

Two deictic tasks were included in this study to examine comprehension of verbal deictic expressions (VD) and comprehension of non-verbal deictic expression (NVD). These two tasks were counterbalanced across participants to control for possible order effects. In this way, half of the participants received the VD task first, and the other half the NVD task.

The screening task was given before the deictic tasks in half of the participants, and after these tasks in the other half of participants.

- *Screening task:*

In the screening task, the colours of the fields were used instead of deictic expressions. Here, the deictic terms were replaced with the colours of the fields, for example, “*Place a pig in the WHITE field and put a duck in the BROWN field*”. Table 5.5 shows the instructions of this task, which included eight instructions: four in which the two animals were directed to different fields, and four in which the two animals were directed to the same field. If the child gave no response after the first instruction, he/she was given the instructions with the colours of the fields. In this way the participants were encouraged to give a response and carry on with the task.

SCREENING TASK

E1's INSTRUCTIONS	E2's INSTRUCTIONS
1- Put a cow in the BROWN field and place a horse in the WHITE field	2- Place a horse in the WHITE field and place a duck in the WHITE field
3- Put a pig in the BROWN field and place the Goat in the WHITE field	4- Put a dog in the BROWN field and put a Sheep in the BROWN field
5- Place a horse in the WHITE field and a put a sheep in the WHITE field	6- Place a pig in the WHITE field and put a duck in the BROWN field
7- Place a horse in the BROWN field and put a cow in the BROWN field	8- Put a pig in the BROWN field and place a sheep in the WHITE field

Table 5.5 Deixis Experiment 3: Screening Task instructions

As described before, this screening task was used to select participants who performed well on this condition. In this way, it was established that the participants who were given the VD and the NVD control tasks had an understanding of the aim of the task, and that errors observed during the deictic conditions were not due to incidental task demands.

- *Verbal Deictic task (VD):*

During the verbal deictic task the participants were asked to put two animals into the fields by one of the experimenters, using verbal deictic expressions, for example “*Put a duck in THAT*

field and put a horse in THIS field". This task included eight instructions (See Table 5.6): four in which the two animals were directed to different fields, and four in which the two animals were directed to the same field.

The terms bring/take, come/go, here/there and this/that were used once in the instructions directed to the opposite fields, for example, with instructions such as "*BRING a duck and TAKE a sheep*", or "*Put a cow THERE and put a pig HERE*"; and the terms come/come, bring/bring, this/this and here/here were used once in the instructions directed to the same field, for example with instructions such as "*COME with a horse and COME with a cow*", or "*Put a pig HERE and put a horse HERE*".

If the child gave no response after the first instruction, he/she was given a non-deictic follow-up instruction using the colours of the fields. In this way the participants were encouraged to give a response and carry on with the task.

VERBAL DEICTIC TASK

E1's INSTRUCTIONS	E2's INSTRUCTIONS
1- BRING a duck and TAKE a Sheep. <i>Follow up instruction:</i> Put a duck in the brown field and a Sheep in the white field	2- COME with a horse and COME a cow <i>Follow up instruction:</i> Put a horse in the white field and a cow in the white field
3- Put a cow THERE and put a pig HERE. <i>Follow up instruction:</i> Put a cow in the white field and a pig in the brown field	4- COME with a Goat and GO with a horse <i>Follow up instruction:</i> Put a Goat in the white field and a horse in the brown field
5- BRING a pig and BRING a sheep. <i>Follow up instruction:</i> Put a pig in the brown field and a sheep in the brown field	6- Put a duck in THAT field and put a horse in THIS field. <i>Follow up instruction:</i> Put a duck in the brown field and a horse in the white field
7- Put a sheep in THIS field and put a dog in THIS field. <i>Follow up instruction:</i> Put a sheep in the brown field and a dog in the brown field	8- Put a pig HERE and put a horse HERE <i>Follow up instruction:</i> Put a pig in the white field and a horse in the white field

Table 5.6 Deixis Experiment 3: VD Task instructions

-Non Verbal Deictic task (VD):

During the non-verbal deictic condition the experimenters used non-verbal instruction instead of the verbal deictic terms. In this case, a nod directed to the appropriate field was used. In this way, participants were asked, for example to “*put a cow* (Experimenter shows nod to Brown field) *and put a pig* (Experimenter shows nod to white field)”. A nod was used instead of a pointing gesture as it was reasoned that a point might be easier to understand than a nod, and because a nod was relatively novel (rather than conventional) in this setting. In this way, the level of difficulty of this task was increased by using head nods. It was important to take level of difficulty into account in order to avoid either ceiling or floor effects in the participants’ performance.

Four instructions were given to the participants (See Table 5.7): two directed to the opposite fields, for example with instructions such as “*Put a duck (NOD TO WHITE) and put a Sheep (NOD TO BROWN)*”; and two directed to the same fields, for example with instruction such as “*Put a horse (NOD TO BROWN) and put a cow (NOR TO BROWN)*”. In this task, as previously shown, a nod towards the appropriate field was given instead of the deictic verbal expression in the instructions. If the child gave no response after the first instruction, he/she was given a non-deictic follow-up instruction using the colours of the fields. In this way the participants were encouraged to give a response and carry on with the task.

NON-VERBAL DEICTIC TASK

E1's INSTRUCTIONS	E2's INSTRUCTIONS
1- Put a duck (NOD TO WHITE) and put a Sheep (NOD TO BROWN). <i>Follow up instruction:</i> Put a duck in the white field and a sheep in the brown field	2- Put a horse (NOD TO BROWN) and put a cow (NOR TO BROWN). <i>Follow up instruction:</i> Put a horse in the brown field and put a cow in the brown field.
3- Put a Goat (NOD TO WHITE) and put a horse (NOD TO WHITE). <i>Follow up instruction:</i> Put a goat in the white field and put a horse in the white field.	4- Put a cow (NOD TO BROWN) and put a pig (NOD TO WHITE). <i>Follow up instruction:</i> Put a cow in the brown field and put a pig in the white field.

Table 5.7 Deixis Experiment 3: NVD Task instructions

5.3.4- Scoring

In each condition, the total number of trials for which the participants put the animals in the correct fields was calculated. Thus, the maximum number of correct responses in the verbal deictic tasks was eight, and in the non-verbal deictic task was four.

5.3.5- Results

a) Verbal deictic task: Table 5.8 shows the distribution of individual scores for the total number of correct responses where the participants put the animals in the correct fields. The participants with autism were not significantly different from the control participants in the number of correct responses given (Mann-Whitney Test, $U=54$, one tailed, ns). When examining those participants who gave four or more correct responses (i.e. those participants who responded correctly in at least half of the trials), there were four out of ten participants with autism and 12 out of 15 control participants (Fisher's Exact Test, one tailed, $p=0.053$).

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CORRECT RESPONSES:	0	1	2	3	4	5	6	7	8
Autistic n = 10	1	2	1	2	1				3
Control n = 15	1			2	3		4	3	2

Table 5.8 Deixis Experiment 3: Number of participants across correct trials in VD task

b) Non-verbal deictic task: Table 5.9 shows the distribution of individual participants according to the number of responses in which the animals were put in the correct fields after the instructions. In this case, participants with autism were significantly less likely to give a correct response than the control participants across the eight trials (Mann-Whitney Test, $U=41$, one tailed, $p < .05$). Only three out of 10 participants with autism and 11 out of 15 control participants gave a correct response after the instructions in at least three trials (Fisher's Exact Test, one tailed, $p=0.04$).

CORRECT RESPONSES:	0	1	2	3	4
Autistic n = 10	3		4	1	2
Control n = 15	1	1	2	3	8

Table 5.9 Deixis Experiment 3: Number of participants across correct trials in NVD task

c) Responses after follow-up instruction: During the VD and NVD tasks, if the participants gave no response after the first two instructions when deictic expressions were used, they were then given a follow-up instruction using the colours of the field. Although the participants included in this study were selected because they understood the basic task requirements, as shown in their

high performance in the non-deictic task, the follow-up instructions were used to confirm this understanding, and to encourage the children to give a response and carry on with the tasks.

In the verbal deictic (VD) task, there were four participants in each group who required a follow-up instruction (where the colour of the fields was used) at least in one trial. Two out of the four participants with autism, and one out of the four control participants who were given this follow-up instruction gave an incorrect response.

In the non-verbal deictic (NVD) task, there were five participants with autism and two control participants who required a follow-up instruction (where the colour of the fields was used) at least in one trial. Here, all the participants except for one participant in the control group gave correct responses.

Thus, the majority of the participants in the two groups who required a follow-up instruction responded with the correct field. In this way, the children's understanding of the requirements of the task was confirmed.

d) Correlation with chronological age and verbal mental age: The associations between the number of correct responses in both the VD and the NVD tasks, and the participants' chronological and verbal mental ages were examined with non-parametric Spearman correlations.

The correlations are shown in Table 5.10. Due to the small groups these correlations are only tentative and need to be considered as suggestive. VMA was related to comprehension of verbal and non-verbal deictic expression in both groups. CA was related to the comprehension of non-verbal deictic expressions in the control group only, but not with the comprehension of verbal deictic terms in either of the two groups.

		Verbal Deictic score	Non-verbal Deictic score
Autistic participants n=10	CA	.165	.064
	VMA	.613	.752
Control participants n=15	CA	.035	.734
	VMA	.789	.627

Table 5.10 Deixis Experiment 3: Correlations with CA and VMA

5.3.6- Summary of Experiment 3 results

Those participants selected for this study were those who could deal with the demands of the task when no deictic expression was used, giving five or more correct spontaneous responses in the screening task. The prediction was that relative to control participants, those with autism would give fewer correct responses in the tests of deixis (verbal and non-verbal). The responses given after instructions where verbal deictic terms were used were not significantly different between the two groups, although participants with autism tended to give fewer correct responses in this situation. The participants with autism, however, showed significantly more difficulties in understanding the non-verbal nod used by the experimenters to indicate a field.

5.4 Experiment 4: comprehension of ‘come/go’ and ‘bring/take’ in autism.

The final experiment was conducted in a separate testing session a few days after the first testing session. This test was administered separately due to the length of time required for it. This

ensured that the participants' performance was not affected by fatigue. This test was based on an earlier study by Clark and Garnica (1974), where comprehension of the deictic terms 'come/go' and 'bring/take' was assessed.

5.4.1- Participants

The participants who took part in this task were the same 20 children with autism and 20 children with learning disabilities that took part in the previous tests.

Due to the demands of this task, five participants with autism and two control participants were unable to finish the task. Moreover, three participants with autism and one control participant performed very poorly throughout the task, in both study and control conditions, and were not included in the final sample in order to ensure that all the participants understood the task. Therefore 12 participants with autism and 17 control participants completed the task. To ensure that the two selected groups were well matched by CA and VMA five more control participants were excluded from the study (without referring to their task performance), leaving a total of 12 participants in the control group. Table 5.11 shows that the two groups were comparable in both their chronological ages and their verbal mental age (according to the British Picture Vocabulary Scale).

	Chronological age mean /sd/ range (yr;mo)	Verbal mental age mean /sd/ range (yr;mo)
Autistic Group n = 12	10;11 SD: 2;11 (8;09-14;06)	6;05 SD: 2;10 (3;01-12;05)
Control Group n = 12	10;09 SD: 1;10 (7;03-13;05)	6;06 SD: 2;10 (3;03-12;03)

Table 5.11 Deixis Experiment 3: Participant characteristics

5.4.2- Predictions

It was predicted that the participants with autism would be less able to understand verbal deictic terms, compared with their matched non-autistic counterparts, but would nonetheless show ability to respond to similar structured instructions devoid of deictic reference (i.e. the control task).

5.4.3- Method

This task was based on a task designed by Clark and Garnica (1974), which tested the comprehension of the deictic terms ‘come-go’ and ‘bring-take’. A novel control task was introduced to establish the specificity of any group differences that emerged.

One female experimenter tested the participants in a quiet room of the participant’s school. The material used for this task was a red plastic field with an opened gate and a set of three plastic animals (a cow, a horse and a pig). One of the three animals was placed inside the field and the other two animals were placed outside the field. All the animals were situated facing a middle

point, and the distance between all of them was the same (approximately 15 centimetres), as shown in picture 5.2. In some trials a leaf was placed next to one of the animals as food.



Picture 5.2 Deixis Experiment 4. Task layout

In the original task designed by Clark and Garnica (1974), the participants were given two sets of 24 instructions where they were asked to show which animal was talking (speaker), or which animal was being spoken to (addressee). The authors used one set of three different animals (for example, a dog, a pig and a monkey) for each set of instructions. So for example, after having shown to the participants which animal was placed inside a plastic garden and which two animals were situated outside the garden, they were asked questions such as: "*The dog says* (from outside the garden), "*Can I come into the garden?*". *Which animal is he talking to?*'. In the present study, to ensure that the participants' performance was not affected by fatigue, the task was reduced to one set of eight instructions where each expression was used twice with the following order of the deictic verbs: GO, BRING, COME, TAKE, GO, BRING, COME, TAKE.

In addition, another set of eight instructions was devised as a control condition where no deictic terms were used. In this condition, what the animals said captured certain characteristics of each one of the animals, in order to differentiate the animal that was talking or the animal that was being spoken to, without using any deictic verb. Table 5.12 shows the instructions of the task.

The animal inside the field was replaced every four instructions in order to shift the point of reference through the tasks. In both conditions, the instructions intended to identify the speaker were counterbalanced with those designed to identify the addressee. Also, both control and study tasks were counterbalanced among participants to control for possible order effects.

Index Task

(The HORSE is in the Field)		Correct response
1	Which animal can say to the COW: "go into the Field"	PIG
2	The PIG has the food. The PIG starts to talk: "I'm bringing the food into the Field". Which animal is the PIG talking to?	HORSE
3	The COW is walking to the Field. Which animal can say : "the cow is coming into the Field"	HORSE
4	The PIG has the food. The PIG starts to talk: "I will take the food into the Field?" Which animal is the PIG talking to?	COW
(The PIG is in the Field)		
5	The COW starts to talk: "I'm going into the Field" Which animal is the COW talking to?	HORSE
6	The HORSE has some food. Which animal can say to the HORSE: "Bring the food into the Field"?	PIG
7	The COW starts to talk: "Can I come into the Field?" Which animal is the COW talking to?	PIG
8	The HORSE has the food. Which animal can say: "the HORSE is taking the food into the Field"?	COW

Control task

(The HORSE is in the Field)		Correct response
1	Which animal can say to the COW: 'My name is horse and I can run fast'	HORSE
2	The PIG wants it to be quiet. The PIG starts to talk: " oinggg...oinggg, stop mooing". Which animal is the PIG talking to?	COW
3	The COW is looking around. Which animal can say : " Cow, they call me Horse and I have a saddle"	HORSE
4	The PIG wants some food. The PIG starts to talk: "Cow, I will have some of your milk!" Which animal is the PIG talking to?	COW
(The PIG is in the Field)		
5	The COW starts to talk: "Horse, I'm going to use your saddle" Which animal is the COW talking to?	HORSE
6	The HORSE has the food. Which animal can say to the HORSE: "They call me Pig and you, HORSE, have all the food?"	PIG
7	The COW starts to talk: "Can I roll in the mud with you, Pig? Which animal is the COW talking to?"	PIG
8	The HORSE has the food. Which animal can say: "Moo, the horse is eating!"	COW

Table 5.12 Deixis Experiment 4: Instructions

5.4.4- Scoring

In each task, each one of the eight trials in which the participants gave a correct answer was given a score of one. Thus, the score of both index and control tasks ranged between 0 to 8.

5.4.5- Results

Tables 5.13 shows the distribution of the participants across number of correct responses in the deictic task. No significant differences were found between the two groups (Mann Whitney, $U=66$, one tailed, ns) on the test of deixis. In fact, the two sets of scores were distributed very similarly. Only one participant with autism and two control participants scored zero in the deictic task, and at least half of the participants in each group (6 participants with autism and 7 control participants) gave a correct answer in more than four trials, with only one participant in each group responding correctly in eight and seven trials respectively.

CORRECT RESPONSES:	0	1	2	3	4	5	6	7	8
Autistic n = 12	1	1	1	3		1	4		1
Control n = 12	2		3			3	3	1	

Table 5.13 Deixis Experiment 4: Number of participants across correct trials in deictic task

Tables 5.14 shows the distribution of the participants across number of correct responses in the control task. Here, the participants with autism were found to perform significantly less well than the control participants (Mann Whitney, $U=32.5$, two tailed, $p<.02$). On inspection of the participants' distribution of scores across the eight trials, however, the two groups were very

similar. For example, 10 participants with autism and 11 control participants responded correctly in six or more trials. It can be seen that the significant difference was due to having 9 control participants, and only 3 participants with autism responding correctly in all eight trials. Only two participants with autism gave a correct response in four trials, and one control participant in five trials. Therefore, all the participants in each group gave a correct response in four trials or more in the control task.

CORRECT RESPONSES:	0	1	2	3	4	5	6	7	8
Autistic n = 12					2		4	3	3
Control n = 12						1		2	9

Table 5.14 Deixis Experiment 4: Number of participants across correct trials in control task

5.4.6- Summary of Experiment 4 results

The performance of the two groups was very similar across the two tasks. For example, at least half of the participants in each group, and all the participants in the two groups gave correct answers in four or more trials of the deictic and the control tasks respectively.

5.5 Summary of results and discussion

Experiment 2 examined the comprehension of the deictic verbs ‘come’ and ‘bring’. The results of this task were difficult to interpret confidently. In spite of having significantly fewer participants with autism than control participants giving a correct response across the four trials of the task, the majority of the participants with autism gave correct responses in at least three of these trials. Thus, it is difficult to know whether the lower propensity of the participants with autism to give a correct response across the four trials was due to a lack of understanding of the deictic terms, or due to other factors that might not be related to deictic understanding.

In Experiment 3, where comprehension of verbal and non-verbal deictic terms was examined, the two groups of participants were not significantly different in understanding verbal deictic expressions, although the participants with autism showed a tendency to give fewer correct responses. However, the participants with autism were significantly less likely than control matched participants to understand instructions where a non-verbal deictic expression (i.e. a head nod) was used.

Finally, Experiment 4 included a perspective-taking task where one animal was placed inside a plastic field, and two other animals were placed outside the field. The aim was to indicate the animal that speaks, or the addressee animal, in accordance with either deictic or non-deictic terms. Here, the performance of the two groups was very similar across the two tasks.

Therefore, the main finding of these experiments is that contrary to predictions, individuals with autism are relatively proficient in their understanding of deictic expressions, although there might be limitation in some aspects of this understanding.

One of the limitations found in the participants with autism, was in relation to their understanding of instructions when non-verbal deictic expressions were used, in Experiment 3. They were significantly less likely than the control participants to give a correct response after these instructions. This result could not be explained by a lack of understanding of the task, in as much as these participants had been selected because they demonstrated a capacity to deal with the task demands.

It is important to highlight that the non-verbal gesture selected for this task was a nod of the head, instead of a point. The reason why a point was not used in the instructions was because people might use pointing more frequently than other kind of non-verbal expression when interacting with individuals with autism, and therefore such individuals might be more used to responding to this kind of expression. Also, individuals with autism have been reported to be proficient in their understanding of pointing when it is used to ask for things, as opposed to 'share' an event (Baron-Cohen, 1989). One possible explanation is that they can either be taught or learn by themselves the meaning of a point through cognitive or social abilities that might be intact in these children. For example, individuals with autism perform well on visual perspective-taking tasks, a capacity that could relate to the understanding of pointing.

However a head nod seems to implicate something more than pointing when it is used to reveal the location of an object, in that it implicates an interpersonal gesture. For example, in Experiment 3, informal observations of the videotapes revealed that the experimenters not only nodded to a location, but also expressed a gesture by raising their eyebrows and moving their bodies forward. The interpersonal information expressed through these nods may explain why individuals with autism had more difficulties than the control participants in understanding the instructions when a head nod was used.

One possible explanation, therefore, is that individuals with autism might have difficulties in understanding these expressions because they fail to understand the attitudes expressed by those non-verbal deictic gestures. It is possible that the deictic use of a head nod, not only indicates a location, but also expresses what the person who uses the gesture is intending to communicate in identifying a location. Thus, the process of identification might be important to understand these expressions.

From the perspective of theory of mind theory, the focus is less on the subjective understanding of the attitudes and feelings of other people who use non-verbal deictic gestures, but rather upon children's conceptual understanding of what another person is intending when using these expressions. Thus, a lack of concepts about the minds of other people might also explain this finding.

The experiments presented in Chapter 4 and 5 were designed to examine production and comprehension of deictic expressions. They revealed only a few subtle group differences throughout these experiments, suggesting that individuals with autism are more proficient with deixis than previously thought.

The question now is how do they come to understand deictic expressions? Whereas non-autistic individuals seem to learn deixis through joint attention routines and role-playing the action of others (Charney, 1980), and identifying with the person who speaks (Hobson, 2002), individuals with autism may rely more on cognitive (Lee *et al.* 1994) and other social abilities that might be intact. For example, it is possible that the processes underlying their abilities to make requests and to recognise visuo-spatial perspectives might provide children with autism some experience of the perspectives of others, and this experience might be relevant in their understanding of deixis.

Thus, it is possible that individuals with autism do not follow the same developmental pathway to achieve deixis, relaying more on impersonal routes than non-autistic individuals, who might relay more on personal aspects of the situations. It is also possible that the acquisition of deixis may depend less on some of the social and interpersonal factors that were thought underlie deictic understanding, for example, the process of identification. Although the present results suggest that individuals with autism can achieve a good level of understanding of deixis, the subtle group differences also suggest that these abilities may not be identical to those of non-autistic children. For example, the participants with autism, in relation to matched control participants, used more 'atypical' deictic terms for distant locations, and had more difficulties in understanding non-verbal deictic expressions. The lack of involvement and identification with other people might explain these subtle difficulties.

Therefore, and to conclude, the results of these experiments suggest that the impact of social factors on deictic understanding and the personal elements involved, might be more subtle than previously thought. It is possible that compensatory social and cognitive abilities explain a major part of deictic understanding. However, it is possible that the process of identification, a non-inferential type of role-taking, might play a role in such understanding in non-autistic individuals.

The next chapter will examine processes of social connectedness and non-inferential role-taking by focusing on interpersonal non-verbal communication in individuals with autism.

CHAPTER SIX

Role-taking aspects of non-verbal communication in Autism

6.1 Introduction.

Every conversation contains some implicit language that goes beyond words. One example of this is the language of gestures, looks, stress and intonation of the voice; in other words, the language of non-verbal communication. This body language often takes precedence over the actual meaning of the words, with the result that a general feeling of mutual understanding occurs together with a feeling of closeness with the other person. Thus, through this interchange of body gestures there is another event taking place in a different level. This event is interpersonal engagement.

It has been noted in previous chapters that interpersonal engagement plays an important role in our understanding of other people as individuals with different perspectives from our own. People with autism appear to have both difficulties in engaging emotionally and psychologically with other people, and difficulties in understanding other people's perspectives. In the first study of this thesis, participants with autism were asked to retell stories taking the perspectives of two story characters. The results of this study suggested that individuals with autism have difficulties in moving from the perspective of one character to the perspective of another. Nevertheless, the majority of participants with autism reached some degree of understanding of different viewpoints in the characters of their stories. Since a minority of participants in the two groups adopted the perspective of the main character and described it conveying that character's psychological orientation, it is difficult to know whether the participants with autism were really having special difficulty in putting themselves in the "character's shoes". There remains the question whether individuals with autism can put themselves into the shoes of real people.

Interpersonal engagement in autism was also studied indirectly in the studies of Chapters 4 and 5, where aspects of deixis that might be dependent on understanding different perspectives, were examined. Again, individuals with autism seemed to be more proficient in their use and understanding of deictic expressions than we had thought. One possibility is that individuals with autism might rely more on cognitive and intact social routes in coming to understand deixis. However, some abnormalities were found in their use and understanding of some deictic expressions. A possible explanation for these abnormalities is that individuals with autism might fail to identify with other people.

The present study aims to examine the processes of interpersonal engagement and role-taking by focusing on non-verbal communication between two people in the context of a one-to-one interaction.

6.2 Non-verbal communication in autism.

The diagnostic and statistical manual of mental Disorders, (DSM-IV: American Psychiatric Association, 1994- See Appendix 1) states that autism involves a qualitative impairment in social interaction. One feature of autism, is a marked impairment in the use of multiple non-verbal expressions such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction. Although there have been several studies that have focused on the use of gestures and non-verbal expressions in individuals with autism (Tantam et al. 1993; Stone et al. 1997; Capps et al. 1999; Camaioni et al. 1997, 2003; Freeman, 1998; Kikuchi, & Koga., 2001; Misailidi, 2002; Nadel 2002), there have been remarkably few investigations on the ways in which individuals with autism use and make use of other people's non-verbal behaviour in informal conversations (Tantam *et al.* 1993; Capps *et al.* 1999). Here, I shall review two studies

that have examined non-verbal communication in individuals with autism in the context of one-to-one conversations.

Tantam, Holmes & Cordess (1993) examined the use of head and neck movements, directed gaze to other people, vocalizations, hand gestures, self-regulation and postural change in participants with Asperger Syndrome¹, who were conversing with another person. Two experiments were carried out where the participants were prompted to talk about 'what people say to each other when they first meet'. Participants were in their twenties, and were interviewed by a person who was blind to their diagnosis. The first part of the study involved a group of nine participants with autism and nine typically developing participants, and the second part involved six participants with autism, who were matched according to chronological age with a group of six schizoid patients. The schizoid patients were selected because they showed a similar degree of social isolation and eccentricity as the autistic participants, but had no developmental features of autism. The first 3 minutes and 50 seconds of each interview were analysed. No significant differences between the two groups were found in relation to the frequency and duration of each kind of behaviour studied. Postural shifts and smiles were infrequent, and mutual smiling tended to be non-significantly less marked in the interactions involving the participants with autism. The authors then examined gaze in response to speech, and found that in the first part of the study, individuals with autism, in relation to their control participants, looked significantly less to the interviewer when they were listening to him. They did not find such differences when the participants were the ones speaking. Although the group difference was not significant, the same pattern was found in the second part of the study. However, the interviewer looked significantly more and spoke significantly less to the autistic partners than to the control participants. The

¹ Asperger syndrome is often considered a type of autism, and for the present purposes I will use 'autism' to refer to Asperger syndrome.

authors attributed this difference to the autistic participants' failure to look to the interviewer while the interviewer was speaking, which could have induced the interviewer to respond differently when interacting with them. The authors concluded that these results might be due to a lack of expected gaze. They suggested that it is the inborn tendency to orientate to human faces and vocalizations that is impaired in autism, and this might lead to the affective abnormalities found in such individuals.

Another study that examined non-verbal communication in autism in the context of a one-to-one conversation was that carried out by Capps, Kehres, & Sigman (1999). They tested the hypotheses that individuals with autism have abnormalities in their non-verbal skills when relating to others. Fifteen children with autism (Mean CA: 3.3; Mean MA: 2.9; Mean IQ: 17.3; Mean language age: 2.2) were closely matched with 15 developmentally delayed children according to verbal ability (Mean CA: 2.6; Mean MA: 2.2; Mean IQ: 13.1; Mean Language age: 1.5), developmental quotient and mental age (according to Stanford-Binet Intelligence Scale). The participants were engaged in a semi-structured informal conversation where they talked with an experimenter about holiday, friends and school for six minutes. Head nods and shakes, smiles, and gestures when describing events (e.g. moving hands and arms) were rated throughout the interaction. Smiles were rated as either appropriate or inappropriate to the context. As the investigators had expected, groups did not differ in terms of head shakes and nods that were used to answer 'yes' or 'no', but the participants with autism were less likely to nod while listening to their partner's talk than were comparison children ($t = 2.3$, $df = 17.40$, $p < .005$). However, children with autism were as likely as the comparison group to smile, display affect with smiles appropriate to the context, and use gestures. The authors pointed out that non-autistic individuals share assumptions about how people think or feel, and that this is what guides our involvement in conversations and what is lacking in autism. They suggest that "*the social deficits in autism are*

perhaps best understood in terms of a profound difficulty in acquiring and making use of conventional knowledge” (p.340).

The two studies presented above show that differences in the non-verbal behaviour of individuals with autism, in relation to verbally matched comparison groups, are surprisingly modest. For example, individuals with autism appeared to use smiles and gestures as much as their comparison groups. However an interesting finding that appears in both studies is that individuals with autism looked less (Tantam et al, 1993) and used fewer shakes and nods (Capps et al, 1999) when their partner was talking. No such differences were found when the participants themselves were talking. The authors explained these abnormalities in terms of a lack of expected gaze (Tantam et al, 1993) and a difficulty in making hypotheses about how people think or feel (Capps et al, 1999). In addition, Capps et al (1999) stated, in relation to individuals with autism, that “*..our efforts to establish complete intersubjectivity inevitably fall short...*” (p.340). Unfortunately they did not examine this observation further.

The present study aims to examine participants’ non-verbal expressions when they are speaking, in relation to those periods of time when another person is speaking. In addition, manifestations of intersubjectivity in individuals with autism will be examined by ‘subjective ratings’, in parallel to behavioural measures. It will be argued that something more basic than a lack of expected gaze, or a lack of ‘theorizing’ about other people’s minds, leads individuals with autism to use fewer non-verbal cues when a partner is talking. This basic process is interpersonal engagement, which, as described in previous chapters, involves the process of identification with the other person.

6.3 A study to examine non-verbal communication in young people with autism

The present study was carried out in two stages. In the first stage, the aim was to replicate previous findings from other studies. Then, in a second stage new predictions were made, based on an hypothesis about a lack of identification by, and with, individuals with autism, and the subjective quality of their engagement.

6.3.1- First hypothesis and predictions

The hypothesis underlying this study is that individuals with autism are less engaged with other people emotionally and psychologically, than are non-autistic individuals. The first predictions were that this lack of social engagement with other people would be manifest in abnormalities in interpersonal non-verbal communication, and more specifically, that participants with autism would not co-ordinate these expressions with another person's utterances, even though they might be able to co-ordinate such expressions with their own utterances. It was expected that in relation to verbally matched control participants, those with autism would:

1- (In accordance with Tantam and Cordess, 1993), look for less time to the interviewer's face during the interview when the interviewer was talking, in relation to those periods when the interviewer was listening.

2- (In accordance to Capps, Kehres, & Sigman, 1999), show fewer nods and shakes of their heads during the interview, when the interviewer was talking, in relation to those periods when the interviewer was listening. (P.S. here, each nod or shake is understood as a single episode).

3- smile less when the interviewer was talking, in relation to those periods when the interviewer was listening.

In this way, the first part of this study attempted to replicate previous findings from Tantam *et al.* (1993), and Capps *et al.* (1999) studies.

6.3.2- Participants

Twelve adolescents (8 males and 4 females) who satisfied the criteria of the diagnostic and statistical manual of mental Disorders (DSM-IV: American Psychiatric Association, 1994- See Appendix 1) for autism, and who met research diagnosis criteria on the Childhood Autism rating scale (CARS: Schopler *et al.* 1986- See Appendix 2) were matched with 12 non-autistic participants with developmental delay and without autism or other diagnosed medical condition (9 males, 3 females) according to chronological age (CA) and performance on the British Picture Vocabulary Scale (BPVS: Dunn, Dunn and Whetton, 1982). Given the relative weakness of the verbal abilities of individuals with autism relative to their non-verbal abilities, it seemed appropriate to match participants by verbal ability because the interaction was in the context of a conversation. The participant characteristics are shown in table 6.1.

	Chronological age mean /sd/ range (yr;mo)	Verbal mental age mean / sd/ range (yr;mo)
Autistic Group n = 12	15;06 SD: 42 (9;02-19;00)	6;06 SD: 19 (4;04-9;09)
Control Group n = 12	14;04 SD: 22 (11;02-17;01)	6;07 SD: 18 (4;00-9;03)

Table 6.1 NVC study: Participant characteristics

6.3.3- Method

This study employed videotapes of conversation that had been previously recorded in order to study self-concepts of adolescents with autism (Lee and Hobson, 1998). At the time the interviews were conducted, Lee and Hobson did not anticipate that the videotapes would be reviewed for the present purposes. The conversation itself took the form of a semi-structured self-understanding interview (that followed the procedure devised by Damon and Hart, 1982), where the participants were asked questions about themselves. The duration of the interviews ranged between 35 and 60 minutes.

Participants were interviewed in a quiet room by a male investigator. For the present study, and before the tapes had been examined, three minutes of the videotaped interview were selected for each participant. It was rated the part of the interview that began with the following question: *'What kind of person are you? How would you describe yourself?'* This part of the interview was selected for the reason that the non-verbal communication of the participants with autism was expected to be, perhaps, more strikingly abnormal when they have to talk about and describe themselves.

At this point, it is important to highlight that at the time the interviews were conducted, the interviewer did not know that the videotapes would be used to examine non-verbal communication between himself and the participants.

6.3.4- Scoring of the interaction and Reliability

The following measures were rated second by second by the author of this thesis who was blind to diagnosis but who was not blind to the hypothesis and predictions of the study. The following ratings, except eye contact which was rated in the interviewer as well, were applied only to the participants:

Eye Contact- second-by-second ratings were made of looks to the conversational partner. The percentage of time of these looks was calculated, out of the total time spent looking to the other person, in relation to the period of time when either the participant or the interviewer was talking.

Shakes and nods- Shakes and nods were coded by counting the numbers of episodes of shaking or nodding. An episode was identified from the beginning of a shake or nod until the end of the head movement. Those episodes where the participants moved their heads to answer 'yes' or 'no' were not included in our analysis. This replicated the approach of previous studies. Each episode was classified according to whether the interviewer or the participant was talking.

Smiles- Smiles were coded by counting the number of episodes of smiling. An episode was identified from the beginning of a smile until the end of the smile. Also, each episode was classified according to whether the participants' smile followed the interviewer's smile or not, and according to whether the interviewer or the participant was talking.

For reliability purposes, an independent rater who was blind to diagnosis and the hypothesis of the study was trained to rate all the behavioural measures on the first minute of 25% of the participants (three participants with autism and three control participants). Inter-rater agreement was estimated with the intraclass correlation coefficient (Shrout and Fleiss, 1979). The intraclass correlation coefficient produces measures of consistency or agreement of values within cases. This coefficient was calculated instead of Kappa because the two compared ratings involved frequencies of occurrence of events and were not ordinal in nature. The IC for the participant's looks was 0.93 when the participants were talking, and 0.99 when the interviewer was talking. The IC for the participant's shakes and nods was 0.91 when the participants were talking, and 0.82 when the interviewer was talking. The IC for the participant's smiles was 0.75 when the participants were talking, and 0.91 when the interviewer was talking. Finally, IC for the interviewer's looks to the participants was 0.98. These coefficients suggest that the measures used were 'excellent' according to Feiss (1981) and, Cicchetti and Sparrow (1981), as shown in Appendix 4.

6.3.5- Results: Stage I.

- Looks

a) Participants' responses: The percentage of time that the participants looked to the interviewer was calculated a) when the participant was talking, and b) when the interviewer was talking. Contrary to what had been predicted, no significant group differences were found in either of these two situations. For example, approximately half of the participants in each group looked to the interviewer for 40 percent or more of the time in each situation. Figure 6.1 shows the mean of the percentage of time that the participants looked to the interviewer in each one of the two situations.

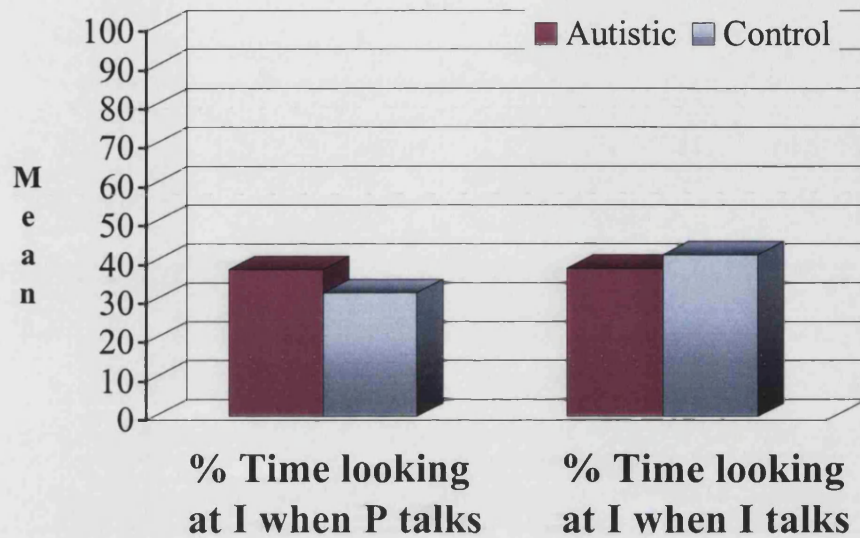


Figure 6.1 NVC study: Percentage of time that the participants looked at the interviewer.

b) Interviewer's responses: the interviewer's looks to the participants were examined using the approach adopted by Tantam and collaborators, without taking into account who was speaking. The overall time that the interviewer looked to the participants throughout the three minutes was calculated. Results showed that the interviewer looked significantly less to the participants with autism than to the control participants (Mann Whitney, $U = 35$, two tailed, $p < .05$). This result was in the opposite direction to the one reported in the Tantam et al. study.

- Head shakes and nods

Those episodes when the participants moved their heads to say 'yes' or 'no' were not included in this analysis. The percentage of the numbers of episodes shaking and nodding was calculated, out of the total number of the participant's 'shakes and nods' episodes, in both situations when the interviewer was talking, and when the participants were talking (See Figure 6.2). As predicted, participants with autism showed significantly fewer number of episodes of shakes and nods in the situation when the interviewer was speaking (Mann-Whitney, $U = 34.5$, one tailed, $p < .025$). In this context three participants with autism and nine control participants shook their heads or nodded at least once (Fisher's Exact Test, one tailed, $p = .02$). Therefore, even though the participants with autism looked to the interviewer as much as the control participants when the interviewer was talking, they showed significantly fewer head shakes and nods in this situation.

In the situation where the participants were talking, the two groups were not significantly different with regard to the percentage number of shakes and nods (Mann-Whitney, $U = 57$, one tailed, ns). In this situation six participants with autism and 10 control participants showed at least one episode of a shake or a nod (not a significant difference between the groups).

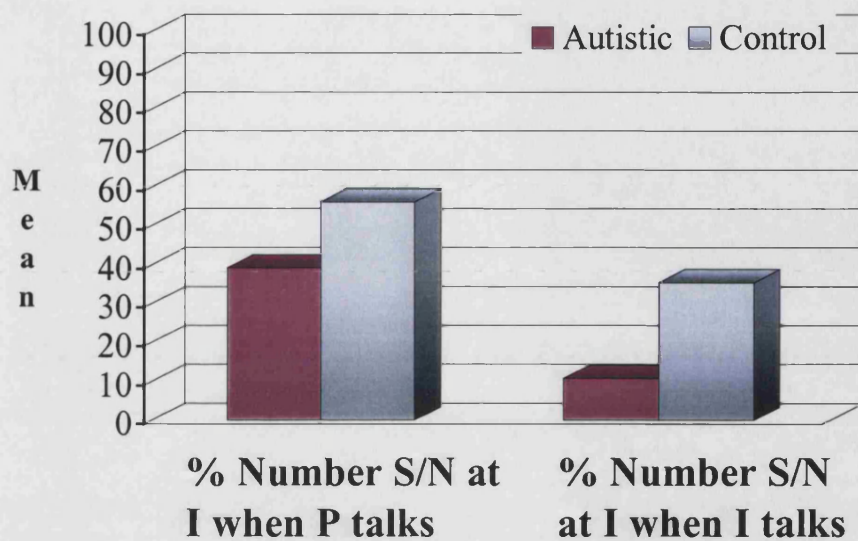


Figure 6.2 NVC Study: Percentage of number of participants' head shakes or nods

- Smiles

The two groups were very similar regarding the number of participants who smiled in relation to who was talking. Nine participants in each group smiled at least once when they were talking, and 7 autistic and 9 control participants smiled at least once when the interviewer was speaking. In addition, 5 participants with autism and 2 control participants smiled after the interviewer had smiled.

6.3.6- Summary of Results: Stage I.

The participants with autism were expected to show fewer non-verbal gestures, and specifically when the interviewer was speaking. Although the two groups were not significantly different in the percentage of time looking to the interviewer (with half of the participants in each group

looking for more than 40% of the time), the group with autism showed significantly fewer number of episodes of shakes and nods in the situation when the interviewer was speaking. In addition, the two groups were very similar in the number of smiles, where a majority of participants in each group smiled at the interviewer during the interaction.

In relation to the interviewer's looks to the participants, results were in the opposite direction to those of Tantam et al. The interviewer looked significantly less to the participants with autism than to the control participants

To summarise at this point, although some subtle differences in the pattern of the non-verbal behaviour were found, between individuals with autism and control participants matched according to verbal ability, what is striking here is the similarity between the two groups in the use of looks, shakes and nods, and smiles.

Therefore, the study began by replicating previous work with regard to the head 'shakes and nods' of participants with autism, which were fewer than those of control participants when the interviewer was speaking, and with regard to 'smiles' where no group difference in frequency was found. However, previous results with regard to the participants' looks to the interviewer in relation to the periods of time when either the participant or the interviewer was talking, were not replicated.

6.3.7- Further hypothesis and Predictions: Stage II.

The children with autism were not different in shaking and nodding their heads when they were the ones talking (i.e. 'according to themselves'), *but* were less inclined to shake and nod in attunement with the interviewer's communication and stance, in the case when the interviewer

was talking. Normally, we shake and nod our heads in accordance with what we experience in tune with the other person, but this is less the case with autism. If children with autism have a lowered propensity to identify with other people, that is to say, to feel 'moved' by others, it might follow that the 'someone else' has a reciprocal difficulty in identifying with the child with autism.

At this point, it was decided to examine further the interviewer's responses to the participants. One prediction was made: that only *when the participants with autism were talking*, the interviewer would show fewer shakes and nods. No further predictions were made with regard to the interviewer's looks or smiles, for the reason that it was unclear whether these measures might be specific indices of identification with the other person. However, these non-verbal expressions were also examined in the interviewer.

Further predictions were made in relation to the hypothesis that the relatively subtle group differences in behavioural indices, belie important group differences in identification. With this in mind, a final prediction was made: on 'subjective' judgements of interpersonal engagement, group differences would emerge. More specifically, it was predicted that independent raters would judge the quality of patterned inter-personal communication to be abnormal in the autistic participants. Thus, it was predicted:

- a) that individuals with autism would be judged to show low levels of affective engagement with the interviewer.
- b) that ratings of overall communication would show the dialogue between participants and interviewer to be less smooth and flowing, in the case of individuals with autism.
- c) that the prevalence of "oddities" in non-verbal communication would be higher in individuals with autism, than in control participants.

6.3.8- Scoring of the interaction and Reliability of new measures: Stage II

The interviewer's looks to the participants, shakes and nods, and smiles, were rated in relation to the periods of time when either the participant or the interviewer were talking. A second rater who was blind to diagnosis and hypothesis of the study was trained to rate the 25% of the ratings (i.e. three participants with autism and three control participants). The intraclass correlation was calculated to examine the consistency or agreement of values within cases. The IC for the interviewer's looks was 0.95 when the participants were talking, and 0.94 when the interviewer was talking. The IC for the interviewer's shakes and nods was 0.63 when the participants were talking, and 0.62 when the interviewer was talking. The IC for the interviewer's smiles was 0.89 when the participants were talking, and 0.95 when the interviewer was talking. These coefficients suggest that all the measures used in this section of the study were 'excellent', except the interviewer's head shakes and nods that were considered 'good', according to Feiss (1981) and, Cicchetti and Sparrow (1981) as shown in Appendix 4.

Judgements were also made regarding the quality of the interpersonal engagement between participants and interviewer. These ratings were 'subjective' in the sense of requiring human judgement, but 'objective' in being subjected to estimates of inter-rater reliability.

Affective engagement: this was the degree of emotional connectedness between the participant and the experimenter. 'Affective engagement' was rated using a one-to-five point scale (see Table 6.2), where a score of one was given for "*no emotional connection*", and a score of five was given when there was judged to be a "*strong emotional connection*" between the participant and the interviewer.

Flow of the interview: This was the degree to which the dialogue between the participant and the interviewer was smooth and flowing. ‘Flow of the interview’ was rated with a one-to-five point scale (see Table 6.3), where a score of one was given when there was a “*minimum dialogue*”, and a score of five was given when the dialogue between the participant and the interviewer was judged to be “*very smooth*”.

Oddities- This was the only measure to be rated in the participants only. ‘Odd’ gestures were those non-verbal expressions in the participants that were considered atypical or uncommon.

An independent rater who was blind to diagnosis, was trained to code affective engagement and flow of the interview on approximately 40% of the participants (five participants of each group). Kappa coefficients were calculated in this case, because of the ordinal nature of these measures. For “affective engagement” the Kappa coefficient was 0.61, and for ‘flow of the interview’ the Kappa coefficient was 0.66, indicating ‘*substantial agreement*’ (Landis and Koch, 1977; See Appendix 4) between the investigator and the rater. The ‘odd’ episodes were not subjected to estimates of reliability, and these results should be considered only suggestive.

AFFECTIVE ENGAGEMENT

Judge the degree of emotional connectedness between the participant and the experimenter:

5.	Strongly connected:	The child is clearly engaged with Ex. She is responsive to the emotional signals expressed by Ex. Further, she integrates an appropriate degree of emotional expression (e.g., smiling, frowning) to both connect and 'hold' Ex. in the course of the interaction.
4.	Moderately connected:	The child is connected with Ex. but to a lesser degree than above. In this case she is reasonably responsive to Ex.'s signals, and occasionally integrates an appropriate degree of expression to connect with Ex.
3.	Somewhat connected:	Some emotional connection is evidenced. Here there is a feeling that the actions displayed by the child are 'rehearsed' or are being 'thought about' before being performed. She may appear to know how to respond, but not involve herself in the interaction. Nonetheless these actions have some power in connecting to Ex.
2.	Minimally connected:	The child is barely connected with Ex. She may appear wooden and inflexible in her reactions to Ex. She displays very little emotional expression herself.
1.	No emotional connection:	The child may respond to Ex.'s questions, but there appears to be no emotional connection between the two. The child may appear 'robotic' or seem to want to be elsewhere rather than with Ex.

Table 6.2 NVC Study: The non-verbal subjective 'Affective Engagement' scores sheet.

FLOW OF THE INTERVIEW

Judge the degree to which the interview was smooth and flowing:

5.	Very smooth:	The interview proceeds at a relaxed and steady pace. There is a strong sense that both the child and the participant are working together in the conversation, and that the work is fairly balanced between the two. The overall impression is of a dialogue that flows in a mutually rewarding manner.
4.	Reasonably smooth:	The interview proceeds at a less relaxed and steady pace than defined above. There is a sense that both parties are working, but the child requires the occasional prompt to stay on track. For example Ex. may need to repeat a question or lay stronger emphasis on a repeated question to draw the child back into the dialogue. The child is responsive to this, and something of a pace is re-established.
3.	Fairly smooth:	The interview seems to move in 'fits-and-starts'. There are times when the child appears to be working but there are equal amounts of time when Ex. needs to work harder to draw her back into a dialogue.
2.	Strained dialogue:	There is a strained dialogue. Ex. has to work very hard to keep some kind of a conversation going. However, the child is drawn on at least one occasion, where there is a feeling that something might develop but then doesn't.
1.	Minimum or no dialogue:	There is hardly any dialogue at all. The child may respond with terse answers to Ex.'s questions, but on the whole she puts little or no effort into an exchange with Ex. Ex. is seen to be doing all the work in conducting the interview.

Table 6.3 NVC Study: The non-verbal subjective 'Flow of the Interview' scores sheet.

6.3.9- Results: Stage II.

- Looks

Figure 6.3 shows the percentage of time that the interviewer looked to the participants in relation to who was speaking. Regarding the periods of time when the participants were talking, the interviewer looked to the participants for most of the time (more than 95 percent of the three minutes) in each group. However, the interviewer looked significantly for more time to the control than to the participant with autism when he (the interviewer) was the one talking (Mann Whitney, $U = 35$, two tailed, $p < .05$). In the latter case the interviewer looked to two autistic and eight control participants for more than 90 percent of the three minutes (Fisher's Exact Test, two tailed, $p = .04$).

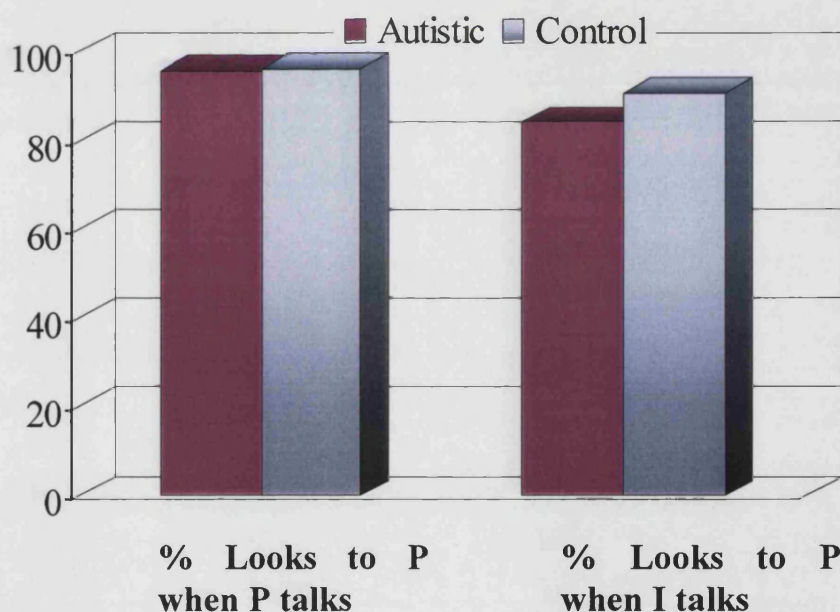


Figure 6.3 NVC Study: Percentage of time that the interviewer looked at the participants

- Head shakes and nods

The prediction was that only *when the participants with autism were talking*, the interviewer would show fewer shakes and nods. Figure 6.4 shows the percentage of the number of the interviewer's 'shakes and nods' episodes, out of the total number of the interviewer's 'shakes and nods' episodes, for each group, in both situations when the participants were talking, and when the interviewer was talking. This figure shows a difference in the profile of the interviewer's head and nod responses. The pattern of results indicated that the percentage of the interviewer's shakes and nods, when the interviewer was talking, was significantly higher with the participants with autism than with the control participants (Mann-Whitney, $U = 19$, two tailed, $p < .01$), although he moved his head to nod or shake at least once at all the participants of the two groups in this case. The percentage of the number of the interviewer's head movements at the participants when the interviewer was talking was 88.8 (SD: 16.2) for the participants with autism and 67.94 (SD: 12.7) for the control participants.

In the case when the participants were talking, and in accordance to the prediction, results indicated that the percentage of the interviewer's shakes and nods was higher, but this time with the control participants than with the participants with autism (Mann-Whitney, $U = 19$, one tailed, $p < .01$). The percentage of the number of the interviewer's head movements at the participants when the participant was talking was 11.2 (SD: 16.2) for the participants with autism and 32.06 (SD: 12.7) for the control participants. In this case, the interviewer moved his head to nod or shake at least once towards five participants with autism, whereas he did so towards all the control participants (Fisher's Exact Test, one tailed, $p = .02$).

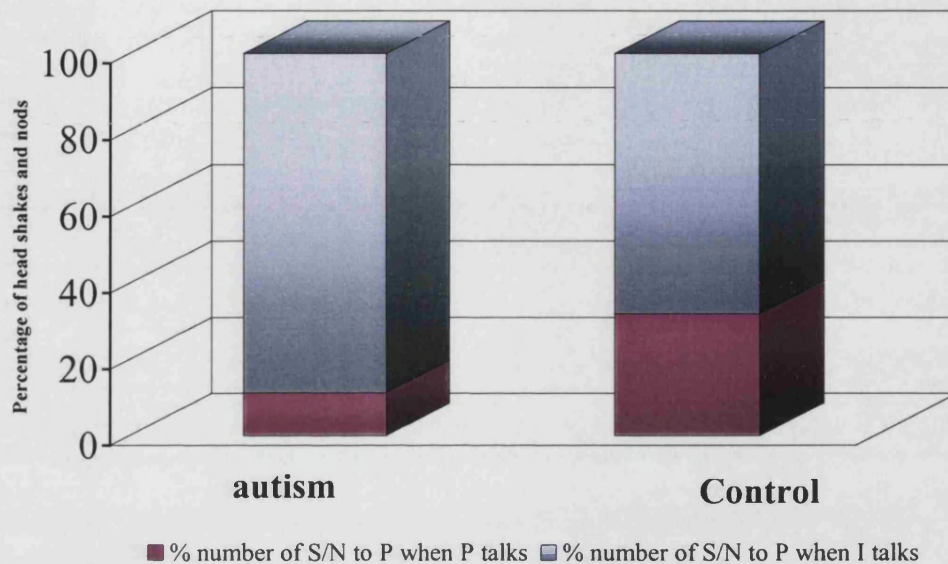


Figure 6.4 NVC Study: Percentage of number of interviewer's head shakes or nods

- Smiles

The pattern of the interviewer's smiles was very similar in both groups. The interviewer smiled at least once to the majority of the participants in each group, both when the participants were talking (towards 9 autistic and 8 control participants) and when the interviewer was talking (towards 11 autistic and 10 control participants). Also, the interviewer smiled at least once after the participant had smiled. This occurred with eight participants with autism and nine control participants.

- Subjective ratings:

a) Affective engagement

Affective engagement was defined as the degree to which participants and interviewer were emotionally connected during the selected three minutes of the interview. Figure 6.5 shows the distribution of participants in the affective engagement score (See Table 6.2). In accordance with predictions, participants with autism were significantly less affectively engaged with the interviewer than the control participants (Mann-Whitney, $U = 26$, one tailed, $p < .01$). Here, only five individuals with autism and almost all the control participants (eleven) were rated with a moderate or greater affective connection with the interviewer (Fisher's Exact Test, one tailed, $p = .01$). Note that only one participant with autism was rated to have a strong emotional connection with the interviewer.

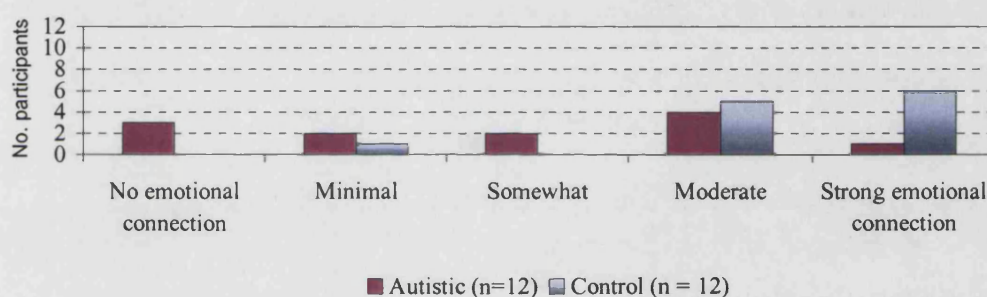


Figure 6.5 NVC Study: Affective engagement scores

b) Flow of the interview

Flow of the interview was rated with a one-to-five point scale (See Table 6.3). The prediction that the dialogue between the participant and interviewer would be less smooth and flowing with the participants with autism than with the control participants was confirmed (Mann-Whitney, $U = 16$, one tailed, $p < .001$). As Figure 6.6 illustrates, 10 control participants and only two participants with autism had very smooth dialogues with the interviewer (Fisher's Exact Test, one tailed, $p = .002$).

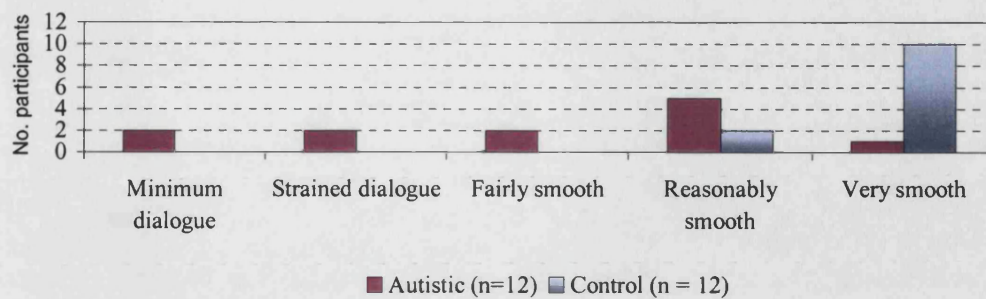


Figure 6.6 NVC Study: Flow of the interview scores

c) Oddities

As predicted, participants with autism showed significantly more oddities than control participants (Mann-Whitney, one-tailed, $p < .001$). In this case, 11 participants with autism and only 2 control participants manifested an oddity at least once (Fisher's Exact Test, one tailed, $p = .00$). Table 6.4 provides a description of the odd episodes. Most of the odd episodes in the group with autism were related to odd face gestures (eight participants), most of which were odd smiles (seven out of the eight). None of the control participants showed this kind of oddity. The two control participants who showed an oddity, showed a nod out of context, and an odd body gesture (where the participant talked without looking at the interviewer, but as if speaking with someone else), respectively.

A1	1- No looks at the experimenter throughout the 3 min.
A2	1-A very brief smile.
A3	1- No looks at the experimenter throughout the 3 min. 2- Fast and forced smile. 3- Fast change of face expression. 4- Fast change of face expression.
A4	1- Unnatural body gesture. 2- Unnatural gesture with the hand. 3- Unnatural gesture with the hand (and the intonation of voice). 4- Unnatural body gesture. 5- Unnatural body gesture. 6- Breaks gaze with I and stands lost within his thoughts. 7- Unnatural gesture with the hand. 8- Unnatural gesture with the hand.
A5	1- Fast and forced smile. 2- S looks at the shelves very interested in the middle of the conversation. 3- Very slow shake of head when saying 'I don't know'.
A6	1- Unnatural face expression. 2- Smile out of context. 3- Smile out of context.
A7	1- S closes eyes when looking at I throughout the whole 3 min. 2- Smile out of context. 3- Odd face expression (moving eyes). 4- Unnatural smile. 5- Unnatural smile. 6- Unnatural smile out of context. 7- Unnatural smile and nod.
A8	1- Unnatural nod following I's nod. 2- Unnatural nod following I's nod. 3- Unnatural nod. 4- Smile out of context. 5- Unnatural nod following I's nod. 6- Unnatural nod following I's nod. 7- P makes faces at the experimenter while he's not looking.
A10	1- Fast and forced smile. 2- Fast change of face expression.
A11	1- Odd fast head movement.
A12	1- Unnatural body gesture.
C1	1- Nod out of context.
C6	1- P talks without looking at I but as if he is speaking with someone else (during 95 second)
A= Participant with autism, C= Control participant	

Table 6.4 NVC Study: Descriptions of odd episodes

6.3.10- Summary of results: Stage II.

The principal prediction of this stage was that only *when the participants with autism were talking*, would the interviewer show fewer shakes and nods. The rationale for this prediction was that the interviewer would nod when he was talking (i.e. 'according to himself'), but because of his difficulty in identifying with the participants with autism, would find it less natural to nod when the participant was talking (i.e. 'according to the other'). In accordance with the prediction, the interviewer used fewer head shakes and nods of the head with the participants with autism, when the participants were talking. Whereas the interviewer showed a significantly lower percentage of head shakes and nods with the control participants, when the interviewer was talking.

In addition, the interviewer's looks showed a different pattern. He looked significantly less to the participants with autism than to the control participants, *but* only when he (the interviewer) was the one talking. No significant differences were found in the case when the participants were talking. Therefore, the lack of the interviewer's shakes and nods when the participant with autism was talking was not simply a reflection of his looking less to the participants. Moreover, the interviewer also smiled to the majority of the participants of the two groups at least once in both situations.

In stark contrast to the similarities found in stage I, where the participants of both groups appeared to use looks, shakes and nods, and smiles, (regardless of who was talking), subjective ratings showed that significantly more participants with autism were a) less affectively engaged with the interviewer, b) showed a fairly or minimum smooth dialogues, and c) showed more odd non-verbal episodes during the interaction.

6.4- Discussion

This study reports four sets of important findings: 1) some of the predicted results were confirmed in the study, 2) some of the predicted results were not confirmed in the study, 3) the difference between the two groups was more evident when subjective measures of interpersonal engagement were employed, and 4) differences between the two groups were obtained in the non-verbal expressions used by the interviewer.

The main predicted result confirmed in the study was that individuals with autism shook and nodded their heads significantly less than the control participants, but only when the interviewer was talking. This result can have two interpretations. The first interpretation gives some support for the interpersonal theory. It is possible that individuals with autism showed this pattern because they did not identify with the interviewer, and therefore, they did not use this kind of interpersonal non-verbal expression to engage with him. Therefore, they were less inclined to shake and nod their heads in attunement with the interviewer's communication and stance. However, they shook and nodded their heads 'according to themselves' when they were the ones talking, because this process might not require identifying with someone else. The second interpretation of this result gives some support for the theory of mind theory. The lack of understanding of the mental states of the interviewer could explain this result. The participants with autism did not shake and nod their heads when the interviewer was talking, because they did not understand the mental perspective of the interviewer.

The results not confirmed by the study were in relation to the use of looks and smiles by the participants with autism, when the interviewer was talking. Contrary to previous findings (Tantam et al, 1993), the participants with autism were not significantly different to the control

participants in their looks to the interviewer when the interviewer was talking. In fact, the two groups were closely similar in their looks to the interviewer (See Figure 6.1.) in both situations, when the interviewer or the participant was talking. Also, the use of smiles was similar in the two groups, suggesting that individuals with autism do use smiles when they speak and when their partners speak. This result is in accordance to the findings of Capps et al. (1999) who also found that individuals with autism were as likely as the comparison children to smile. In Tantam et al. (1993) study very few participants smiled in each group.

These results suggest that the lack of shakes and nods of the participants with autism when the interviewer was talking cannot be explained by a general failure to use non-verbal expressions, in as much as individuals with autism used looks and smiles during this situation. Moreover, even though individuals with autism seemed to be proficient in the use of several non-verbal expressions, they show a lack of interpersonal engagement with their partners. For example, in spite of the use of looks, shakes and nods and smiles when interacting with another person, individuals with autism show low affective engagement and strained dialogues. Moreover, even though they used smiles as often as non-autistic individuals, the quality of some of these smiles were rated as atypical and odd (e.g. a fast smile). Individuals with autism might use smiles, shakes and nods or looks to other, but the processes involved in these expressions seem to be different from the ones involved in non-autistic individuals.

One possible interpretation of these results is that whereas non-autistic individuals might use these expressions naturally and unconsciously while engaging with other people (and perhaps driven by the process of identification), individuals with autism might use these expressions more consciously, driven by cognitive compensating strategies. Moreover, shakes and nods appear to be non-verbal expressions that are more influenced by our identification with the person we speak, as suggested by the results. The low affective engagement and flowing dialogues between

the participants with autism and the interviewer might be explained by their lack of identification with the interviewer. In addition, the presence of non-verbal odd expressions in the participants with autism might be explained by their lack of experience of the subjective experience of other people, a process that might be important in the acquisition of non-verbal expressions and in their use in social contexts.

On the other hand, and from the point of view of the theory of mind theory, a lack of understanding of mental states in the interviewer might also explain the lack of interpersonal engagement between the participants and the interviewer. It is possible that the use of head shakes and nods requires more understanding of the perspectives of other people than the use of other expressions, like smiles. It is also possible that the low affective engagement and flowing dialogues between the participants with autism is the consequence of the difficulties of individuals with autism to think about the psychological perspectives of other people. Also, if individuals with autism have difficulties in thinking about what another person is thinking, they may not be aware of how to use non-verbal expressions normally. This might explain the high prevalence of non-verbal oddities in the participants with autism.

Tentatively, I would conclude that non-verbal expressions are acquired in a less inferential and cognitive context. It is possible that we “learn” how to use these expressions, through non-inferential processes by integrating other people’s non-verbal expressions into our own non-verbal repertoire.

Finally, an interesting finding was obtained regarding the non-verbal expressions used by the interviewer. Whereas he looked more often to the control group than to the group with autism when he was the one talking, the interviewer showed fewer head shakes and nods with the participants with autism when the participants were talking. The interviewer was unlikely to

respond differently with the autistic participants consciously because, although he was not blind to the participants' diagnosis, he did not know that the interviews would be used to study non-verbal communication at that time. Tantam et al (1993) also reported that the interviewer in their study responded differently with the autistic than with the control groups by looking significantly more to the autistic partners, and suggested: *"the Asperger subjects' social behaviour was abnormal and induced a corresponding abnormality in the interviewers"* (p.130). Although they did not examine these results in relation to the periods of time when either the participant or the interviewer was talking, these results are only partly in keeping with the ones reported here. In our study, the interviewer looked somewhat less to the autistic than to the control group. Moreover, the main finding of Tantam et al. study was that individuals with autism showed significantly fewer looks than the control participants when the interviewer was talking. This result was not significant in our study, although there was a tendency towards the same direction.

One possible reason that could explain these different findings may not only rely on the different topic of conversation chosen in each study (self-understanding, as oppose to what people say to each other when they first meet), but also on the different control groups used in each study. In our study the participants with autism were matched according to verbal ability with non-autistic mentally delayed participants. Tantam et al. (1993) used two different control groups, typically developing children (with unreported IQ) and schizoid individuals matched according to verbal IQ. Thus, this study might have been controlling for different abilities than the study included in this chapter.

Finally it is important to take into consideration that the participants of Tantam et al. study were individuals with Asperger syndrome, whereas the participants of our study had a diagnosis of autism based on the DSM-VI criteria for autism. It is unclear whether these two groups of individuals with autism may differ in their use of non-verbal expressions.

One possible explanation of these results is that the interviewer experienced the difficulties of individuals with autism in identifying with him, and also failed to identify with the participants with autism. Or the interviewer might have looked less to the autistic participants when he was the one talking because he was not being reassured with shakes and nods by the participants with autism. A lack of understanding of the interviewer's mental states can not explain these results, since the participants with autism shook and nodded their heads when they were talking as much as the control participants, and still the interviewer shook and nodded his head less with the participants with autism in this situation. Tentatively, one might conclude that the pattern of results can be better explained by the interpersonal theory than the theory of mind theory.

This study presents limitations that need to be taken into consideration. For example, the small size of the sample makes the results difficult to generalize to other populations. The matching procedure can also explain the lack of striking differences between the two groups, since, although the aim of the study was to examine non-verbal expressions, the participants were matched according to their verbal ability. This type of matching is conservative in the sense that individuals with autism perform better on non-verbal than on verbal tasks, and therefore the non-verbal understanding of the group with autism might have been above that of the control participants. However, even though the participants were matched according to verbal ability, there were some significant findings that provide relevant information about the use of non-verbal interpersonal communication of people with autism.

In relation to the interpersonal theory, this study suggests that although looks and smiles seem to be used very often in interactions, shakes and nods appear to play a special role when someone becomes a listener. They also suggest that there are subjective processes of interpersonal engagement underlying conversations. The results of this study illustrates that interpersonal

engagement is a process that happens between two people, and when one pole of the dyad is weak the other pole becomes weakened as well. What these results suggest is that there may be something more unconsciously interpersonal, and perhaps implicating the process of identification, in the use of shakes or nods that may be different from the use of other behavioral expressions, like smiles or looks. Shakes and nods are used very often when interacting with other people, and they seem to be guided by the intersubjective interpersonal pull which directs every conversation.

This study sheds some light on the nature of the non-verbal communication in autism in the context of a one-to-one interaction. It also sheds some light about the processes that underlie every conversation, which can be summarized with two words: *social connectedness*.

CHAPTER SEVEN

Summary of findings and general discussion

7.1 Synopsis of theoretical background of the thesis

This thesis examined the ability to adopt different psychological perspectives in individuals with autism. In typically developing children, this ability unfolds during the early years of life and provides the necessary concepts to think about the internal perspectives of other people. Conceptual role-taking has been described as the mechanism that allows young children to think about the thoughts and feelings of others, a mechanism that is impaired in individuals with autism. Yet there is a dispute about the origin of such role-taking. The interpersonal theory, suggests that the ability to be ‘moved’ by other people’s attitudes and feelings, a non-inferential form of role-taking, is impaired in individuals with autism (Hobson, 2002), and that this impairment leads individuals with autism to have later difficulties in thinking about other persons’ perspectives. The theory of mind theory locates the problem in more cognitive mechanisms, and specifically, in the ability to ‘metarepresent’.

The aim of this thesis has been to apply scientific methodology to examine particular aspects of both conceptual and non-inferential aspects of role-taking in individuals with autism, with the intention of defining more precisely the nature of such limitations. A range of studies has been carried out to examine role-taking in autism, focusing on three main areas of research: a) narrative role-taking, b) deixis, and c) non-verbal interpersonal communication.

Chapter 1 made the distinction between interpersonal and cognitive aspects of role-taking. Non-inferential role-taking was described as the ability to move into and adopt the emotional or subjective perspective of another person. Engagement in primary intersubjectivity- the earliest form of relatedness between infants and caregivers- reveals that this kind of role-taking might already be present in the earliest months of life (Trevarthen, 1979). Here, it seems to exist in the

form of a dance between babies and their caregivers, in which they respond to one another in a co-ordinated and attuned manner. Following the first few months of life, infants begin to increasingly attend to objects in the world, outside of the dyadic interaction with their caregivers. They begin to follow the gaze, the head turn or the point of an adult, as well as to use non-verbal gestures directed to aspects of the world in relation to the orientation of other people. This type of relation is more clearly related to role-taking, in that the child's orientation appears to be affected by the orientation of someone else. This new phase of secondary intersubjectivity involves the coordination and sharing of infant-caregiver understanding about objects and events. The infant participates in interpersonal interchanges with another person concerning the world around them, a process that is evident in social referencing and joint attention episodes. During the three years that follow, children develop the cognitive ability to think about what another person might be seeing, thinking, or believing, with what has been called conceptual role-taking.

Two main theories that examine the origins of conceptual role-taking were described in this chapter: the 'interpersonal' theory and the 'theory of mind' theory. The interpersonal theory suggests that the ability to engage with other people from early in life is what grounds the understanding of self and others as centres of consciousness. The process of identification is suggested as the mechanism that allows young infants to 'move' to the stance of another person with feelings, and to experience aspects of the world through the 'emotional viewpoint' of another person (Hobson, 1999. 2002).

In contrast, the theory of mind theory considers the child's understanding of different points of views and perspectives in other people as an outcome of previous cognitive developments. It also considers the child's social understanding to be conceptual in nature. In other words, the child needs to have concepts before he/she can have this level of awareness of self and other.

The end of Chapter 1 outlined the hypothesis that basic non-inferential role-taking processes, related to the way we identify with the attitudes and feelings of other people, are relatively lacking in individuals with autism. This view was presented as the underlying hypothesis of this thesis.

Chapter 2 described the case of autism, and examined how the above theories portray the difficulties of individuals with autism in understanding the minds of other people. These two theories disagree in their views regarding the primary impairment that leads individuals with autism to have role-taking difficulties in understanding the psychological perspectives of others. Whereas the conceptual theory suggests that individuals with autism have an impairment in the modular system that provides young children with the necessary equipment to develop concepts about other people's minds (i.e. conceptual role-taking), the interpersonal theory suggests that a more basic non-inferential role-taking underlies such impairment, in particular, the process of identification.

The scientific literature presented suggests that individuals with autism have difficulties in understanding some mental states, but not others, and that such difficulties do not always seem to be accounted for by cognitive limitations. For example, studies of emotion recognition suggest that individuals with autism are proficient in understanding certain emotions; however, when using more subtle methods of investigation, individuals with autism show difficulties in this respect. They appear, therefore, to use different compensatory strategies than non-autistic children, in some situations to achieve the same goals.

Impairments in primary and secondary intersubjectivity were reported in individuals with autism, and limited non-inferential role-taking was suggested to be the possible mechanism responsible for these impairments. However, evidence from parents and family home movies illustrate the

difficulty in establishing whether, as the interpersonal theory suggests, an impairment in non-inferential role-taking might be present from birth in individuals with autism.

Other studies reported some evidence to support the proposal that individuals with autism have difficulties identifying with other people. Moreover, studies with congenitally blind children, and children raised in Romanian orphans, suggest that an early and severe deprivation of social contact (either biologically rooted as in the case of individuals with autism and those who are congenitally blind, or environmentally rooted as in the case of Romanian orphans) can lead to a picture that is remarkably similar to that of autism.

Although the studies of this thesis were not designed to examine the early impact of limitations of role-taking on social and cognitive capacities of the child with autism, they were intended to test whether, in relatively older children and adolescents, there is evidence for *qualities of impaired role-taking* that seem to be in keeping with the interpersonal theory of autism and beyond that which could be explained by the 'theory of mind' theory. These aspects of role-taking were examined taking into consideration important methodological issues. It was vital to distinguish between a specific deficit in performance on a task, and a deficit due to 'general' forms of cognitive disability. In this way, in order to control for possible effects of the general cognitive abilities of the participants on the tasks, the participants with autism were matched with non-autistic participants according to chronological age and verbal mental age. Also, where possible, control tasks were devised in order to impose similar level of difficulty in cognitive demands upon the participants, as the study tasks. It was important to establish that the tasks were not either too difficult or too easy for the participants in order to avoid any ceiling or floor effects.

Before discussing the theoretical implications of the findings, and the limitations of the studies and possible future investigations, a summary of the studies reported in this thesis, and their findings will be given.

7.2 Summary of studies

This thesis was designed to increase understanding of certain aspects of role-taking in young people with autism. In particular, it was intended to increase understanding of impaired and intact aspects of conceptual and non-inferential role-taking in these individuals.

Chapter 3 was concerned with the ability to adopt the role and/or the perspective of another person in individuals with autism. This ability has mainly been studied by examining the way individuals with autism modify their language according to social context (Baltaxe, 1977; Menyuk, 1969; Prutting, 1982; Loveland *et al.* 1990, Tager-Flusberg, 1981), or by examining their use and understanding of mental state terms (Baron-Cohen *et al.* 1985; Perner *et al.* 1989; Reed and Peterson, 1990), but it has rarely been studied by examining directly their difficulties in adopting the perspective of another person. The aim of the task included in Chapter 3 was to examine this aspect of role-taking by investigating the ways in which individuals with autism organise stories according to the roles and the perspectives of the characters.

Role-taking was studied in Chapters 4 and 5 from the point of view of deixis. The study of deixis was considered relevant for our focus of study since the child's understanding of deictic expressions might depend on both conceptual and non-inferential role-taking. It was argued that although cognitive factors may play an important part in the children's understanding of deictic expressions, non-inferential role-taking might also shape deictic understanding and use. Thus, a

set of tasks was designed to examine production and comprehension of verbal and non-verbal deictic expressions in individuals with autism.

Finally, Chapter 6 examined the processes of interpersonal engagement and role-taking by focusing on the non-verbal communication exchanged between two people in the context of a one-to-one interaction. The aim of this study was to examine whether a possible impairment in identification with other people might be reflected in the ways in which individuals with autism use non-verbal expressions in a conversation with another person. Moreover, this study examined how such impairment might also be reflected in the ways in which a conversational partner uses these non-verbal interpersonal gestures. In addition, a novel approach was introduced to measure objectively, 'subjective' forms of interpersonal engagement.

7.3 Summary of findings

The underlying hypotheses of this thesis was that suggested by the “interpersonal theory”: *individuals with autism have an impairment in the ability to adopt different psychological perspectives (conceptual role-taking), because of more basic impairments in identifying with and moving (with feelings and attitudes) to the perspectives of other people (non-inferential role-taking).*

In addition, the “theory of mind theory” was introduced as an alternative theory that could also explain some of the results found across the studies of this thesis. Next, I shall summarize the findings of these studies, by focusing on how the ‘interpersonal theory’ and the ‘theory of mind’ theory might explain them.

7.3.1- The interpersonal theory

One of the most striking results found across the studies of this thesis, is the similarities between the participants with autism and matched non-autistic participants in certain aspects of role-taking that were predicted to be impaired in individuals with autism by the interpersonal theory. Participants with autism, like their counterpart participants, a) reached some degree of understanding of different roles among characters described in stories; b) used verbal and non-verbal deictic expressions when indicating a location to another person; c) were proficient in their understanding of verbal deictic expressions; and d) used non-verbal interpersonal expressions when in a conversation with another person.

However, other findings revealed significant differences between the participants with autism and the non-autistic matched participants, as predicted by the interpersonal theory. Participants with autism, in relation to control participants, a) had more difficulties in role-taking aspects of stories that were told from the point of view of a story character; b) used 'atypical' deictic terms when referring to a location distant from them; c) had more difficulties in understanding non-verbal deictic expressions; d) used fewer shakes and nods of the head when another person was talking to them, a pattern that was also found in the interviewer's head shakes and nods when the participants with autism were talking to him; and e) were less affectively engaged with another person and showed more strained dialogues and odd non-verbal expressions, when conversing with another person.

To begin with, I shall focus on those results that are not in keeping with the 'interpersonal theory' hypothesis. I shall deal with each of the above sets of findings in more detail.

Individuals with autism were found to reach some degree of role-taking when adopting the perspective of a story character, when using and responding to deictic expressions, and when using certain interpersonal non-verbal expressions when conversing with another person.

What these results suggest is that individuals with autism have some role-taking ability that they can use in some situations. It is perhaps important to note that in the case of the story-telling task and the deictic tasks, the situations presented were highly structured, and this may have rendered the tests more manageable for the children with autism, than natural social situations. The role-taking abilities of the children might well be less adequate in other contexts, such as when they need to adopt the perspective of another person in natural social exchanges.

The question now is how children with autism come to achieve some level of role-taking. There are two sets of issues here. One is whether there are forms of role-taking that do not rely upon the kinds of interpersonal factors, in particular the process of identification, that are important in the most 'social' forms of perspective-taking. Thus, the children's ability to perform relatively well in the tests of understanding deixis, might arise on the basis of whatever social-perceptual mechanisms are intact in autism (such as the reading of people's intentions, or whatever processes underlie their abilities to make requests and to recognise visuo-spatial perspectives) and not require attunement to the attitudes of others.

The second issue is whether, even in the more socio-emotional aspects of interpersonal engagement, children with autism have a total or only a relative disability. It is a feature of clinical experience that whereas a child with autism can at times appear totally unconnected with the feelings and attitudes of someone else, at other times the child appears to be at least somewhat sensitive to the other person's mental state. Therefore, even if it is the case that children with autism have a lesser propensity to identify with the attitudes of others, this may be a limitation

rather than a complete absence, and may not be so severe as to completely undermine basic role-taking abilities.

Next, I shall focus on those results that are in keeping with the ‘interpersonal theory’ hypothesis.

Some of the results presented in this thesis, suggest that individuals with autism might have specific difficulties in those aspects of conceptual role-taking that might be more dependent on interpersonal factors, in relation to other aspects that might be more dependent on the general cognitive ability of the child. For example, the narrative role-taking task revealed aspects of perspective-taking that are concerned with the children’s understanding of other people’s perspectives and viewpoints, and with the flexibility to understand that the same situation can be perceived differently by different people, despite relatively high verbal abilities (as established through matching) and proficiency in giving descriptions in terms of thought and feelings.

In addition, tentative findings suggest that verbal mental age might be unrelated to role-taking ability in individuals with autism, whereas the two appear to be associated in non-autistic participants. This result is in keeping with the suggestion that individuals with autism might use different routes than non-autistic participants to achieve some role-taking understanding, and/or to using language. Thus, whereas in non-autistic children, language ability might be strongly related to role-taking aspects of interpersonal understanding, in children with autism, language ability might be linked with other, less interpersonal, capacities.

There is some evidence to support this suggestion, which comes from the studies that examined deictic understanding in individuals with autism.

Individuals with autism were found to have differences in the use of the terms 'here' and 'this', perhaps reflecting a lack of contrast between the terms used to locate things close to the speaker but not far away from the speaker. This result might suggest that individuals with autism do not anchor in the point of view of the speaker, whose 'here' and 'this' are the other person's 'there' and 'that'.

Another finding that is in keeping with the interpersonal theory, is that individuals with autism have limited understanding of non-verbal deictic expressions, like a head nod used to locate an object. This finding suggests that individuals with autism have difficulties at this level of non-verbal (rather than verbal) communication. This is compatible with the view that individuals with autism might have difficulties in understanding these expressions because they fail to move to the subjective perspective of other people and understand the attitudes of this person in relation to the deictic gesture expressed.

What gives additional force to the interpersonal account, is that this predicted that there might be aspects of impaired non-inferential role-taking in individuals with autism, that might not only be reflected in the ways in which they use these expressions with other people, but also in the ways in which other people use these expressions when interacting with them. As predicted, when conversing with a child with autism in the context of an interview, an interviewer appeared to use fewer shakes and nods of the head when the child with autism was talking, as opposed to when the interviewer was talking.

The notion that identification is a process of moving to the subjective experience of the other, and responding according to this experience, explains the lack of shakes and nods of the interviewer when the child with autism was talking. What might be happening here, is that the interviewer

was not identifying with the participants with autism because he *felt* the lack of identification of the child with autism with him.

The same pattern was found in the participants with autism, in that they used fewer interpersonal expressions when the interviewer was talking, as opposed to when they were the ones talking. In particular, they used fewer shakes and nods of the head. However, as seen before, they appeared to use other non-verbal gestures when the other person was speaking, like looks or smiles. Obviously, it might be possible to interpret this finding as providing evidence for or against the interpersonal theory. However, the use of novel subjective measures revealed that even though individuals with autism appeared to use looks, smiles, and shakes and nods (at least when they were talking) when conversing with another person, they seemed to be less affectively engaged with the interviewer, and showed more strained dialogues, than language matched non-autistic individuals. These results suggest that there might be subjective processes of interpersonal engagement underlying conversations that cannot be reduced to the use of specific behavioural expressions. They also suggest that individuals with autism have limitations in using non-verbal expressions when they are required, but fail, to identify with the person who speaks.

Therefore, and to conclude at this point, the present thesis has provided evidence to support, and at the same time to qualify, the view of the interpersonal theory that individuals with autism have specific impairment in their ability to identify with others, that is to say, in their ability to perceive and respond to the subjective experiences of others. The evidence also suggests that individuals with autism can achieve some degree of role-taking by using alternative routes based, perhaps, on intact cognitive and social capacities. Such capacities might be particularly important for achieving deictic understanding in individuals with autism.

7.3.2- The theory of mind theory

To begin with, I shall focus on those results that *are not* in keeping with the ‘theory of mind’ hypothesis.

It is not clear how the theory of mind perspective would explain the finding that individuals with autism can achieve some level of role-taking. It is possible that individuals with autism might have different degrees of impairment in theory of mind. In this way, there may be individual differences among persons with autism in their capacity to understand what other people believe or know, and therefore some aspects of role-taking ability might be intact in some of these individuals.

However, the participants with autism were found to have limitations in role-taking aspects of stories that they produced from the point of view of a character. This result cannot be explained by an impairment in understanding mental state terms *per se*, since the participants with autism used mental state terms similar to those used by language matched non-autistic participants. However, this study only examined productivity and not comprehension of mental state terms, and it is plausible that these participants might show some limitations in their understanding of mental state terms in other situations. Such limitations might explain why individuals with autism were found to have more difficulties in those aspects of the task that were related to perspective-taking ability, and not to other capacities that may not rely on an understanding of a theory of mind, like the co-ordination of the story content.

Difficulties in understanding the mental states of another person cannot explain why individuals with autism showed low affective engagement with the interviewer, and had strained dialogues. These subjective measures revealed striking limitations in individuals with autism in aspects of

interpersonal engagement, even though these children used smiles, looks, and, shakes and nods of the head when conversing with another person.

In addition, the lack of head shakes and nods found in the interviewer when the participants with autism were talking, cannot be explained by an impairment in understanding mental states. According to this theory, the interviewer would be expected to reinforce the participants with autism when they were talking, as much as to the non-autistic participants, but this was not the case. This result suggests that there might be interpersonal processes underlying conversations that cannot be reduced to understanding the mental perspective of another person.

To summarize, from the theory of mind theory point of view, a lack of an understanding of a theory of mind in others does not seem to explain some of the results of these studies, like for example, a) the difficulties of individuals with autism in achieving a certain level of role-taking when telling stories from the point of view of a character, even though the participants used mental state terms as much as the control participants; b) the lack of head shakes and nods by a person who was listening to a child with autism, as opposed to when the that person was talking; and c) the lack of subjective aspects of interpersonal engagement between participants with autism and another person, even though individuals with autism used non-verbal expressions.

Next, I shall focus on those results that are in keeping with the ‘theory of mind’ hypothesis.

Individuals with autism were found to be proficient in their use and understanding of verbal deictic expressions. One possible, and tentative, explanation, is that deictic understanding might not be impaired in individuals with autism, because its development might not require understanding the mental states of other people. This explanation, however, does not explain the whole picture since, as reported, subtle limitations in deixis were found in these individuals.

Thus, another explanation could be that deictic understanding depends only to some extent on the theory of mind ability of the child. This could explain the subtle limitations found in the participants with autism in some aspects of deixis.

For example, individuals with autism were found to show 'atypical' use of the deictic terms that refer to a far location, as opposed to the ones that refer to a location close to the child. One possible interpretation of this result is that in order to understand that the terms 'this' and 'here' only refer to a location close to the speaker, one needs to see how other people use these terms before using them correctly. An understanding of the psychological perspective of other people, might be an important factor in understanding how other people use these terms. Thus, a child with autism might see other people using the terms 'this' and 'here' to refer to things that are close to them but far away from the child with autism, and therefore when the child refers to objects that are distant, he/she might use these terms too. The question is whether this interpretation is plausible.

Another finding that may provide some support for the theory of mind theory, is that individuals with autism were found to have difficulties in understanding non-verbal deictic expressions. One possible interpretation of this result is that individuals with autism have difficulties in understanding the intentions of other people when they use non-verbal deictic gestures to refer to a location. Thus, it is possible that a subjective understanding of the attitudes and feelings of other people, is not necessary to understand non-verbal deictic gestures, whereas a conceptual understanding of what another person is intending when using these expressions might be. Thus, conceptual limitations in understanding the minds of other people might also explain this finding.

A similar explanation could apply to the finding that individuals with autism use fewer interpersonal gestures, in particular shakes and nods of the head, when another person is talking,

as opposed to when they are talking. It is possible that individuals with autism used fewer interpersonal non-verbal expressions in this situation because of a lack of understanding of what the interviewer was thinking. From this perspective, shakes and nods of the head might be understood as expressions that are used to reinforce the conversational partner, and to let the other person know we understand what he/she is saying. However, this suggestion does not explain why the same pattern was found in the interviewer, whose theory of mind ability was expected to be intact.

Therefore, a lack of an understanding of a theory of mind in other people does not seem to explain those subjective aspects of interpersonal engagement that were found to be limited in individuals with autism.

7.4 Implications of the research findings

The interpersonal theory suggests that individuals with autism are impaired in their ability to move into the subjective perspectives of other people through feelings and attitudes. This theory asserts that an impairment in the process of identification – one of the processes involved in non-inferential role-taking – would lead to limited conceptual role-taking. This thesis examined aspects of conceptual and non-inferential role-taking in individuals with autism that might be impaired.

Chapter 3 reported a study that was designed to examine aspects of conceptual role-taking in individuals with autism, in particular, the ability to take the role of another person. This study introduced a method of research never used before with individuals with autism, where they were

asked to tell stories from the point of view of different characters. The results of this study suggest that individuals with autism can achieve some degree of understanding of the roles and perspectives of story characters. However, they seem to be less consistent in applying the role-taking ability they have.

This study supports the suggestion that individuals with autism have limitations in moving flexibly across different viewpoints. It also confirms previous findings that when individuals with autism are well matched with non-autistic individuals according to language ability they seem to use similar mental state terms.

Therefore, this study has provided new evidence to suggest that individuals with autism are perhaps more proficient in understanding different perspectives in other people than research and theory have previously suggested. It appears that individuals with autism have some role-taking ability that they can use in some situations. However, they seem to be more limited and less flexible in using this ability than non-autistic individuals.

Chapters 4 and 5 examined the use and understanding of deictic expressions in individuals with autism. There are very few studies that have examined whether or not individuals with autism use and understand these expressions. The majority of these studies have focused on the understanding of individuals with autism of personal deictic expressions (Jordan, 1989; Tager-Flusberg, 1989; Lee *et al.* 1994). Although these studies report some limitations in the use of personal pronouns in individuals with autism, they reveal that they might have fewer difficulties in the use and understanding of these terms than has been previously reported. However, they also suggest that structured and organized contexts, like the context created in a scientific experiment, could be obscuring difficulties that they might have in more naturalistic contexts.

In relation to the use and understanding of non-verbal deictic gestures, such as pointing, research in this area suggests that individuals with autism have specific difficulties in using and responding to gestures that are used to share events, as opposed to making requests (Baron-Cohen 1989, Baron-Cohen *et al.* 1992; Baron-Cohen *et al.* 1996; Wimpory *et al.* 2000). However, responding to some of these deictic gestures, like gaze and pointing, has been found to be related to verbal mental age in individuals with autism (Leekam and Hunnisett, 1998; DiLavore and Lord, 1995; Mundy *et al.* 1994), suggesting that there are aspects of the language of individuals with autism are associated with these abilities. However, first hand reports obtained from parents, suggest that even those children who appear to be proficient in following the point and the gaze of another person in laboratory situations, have difficulties in natural contexts. Therefore, the picture of deixis in individuals with autism is unclear.

The studies reported in this thesis (in chapters 4 and 5) provided new evidence concerning one area of research never examined before in individuals with autism: the production and comprehension of locative deictic expressions, such as the verbal terms, 'here-there', 'this-that', 'bring-take' and 'come-go', and the non-verbal expressions of a point, or a nod of the head to express these concepts.

The results of this study provide new evidence to suggest that individuals with autism might be proficient in their use of these verbal and non-verbal deictic expressions. These results also suggest that although individuals with autism might be proficient in their understanding of verbal deictic terms, they might, at the same time, have limitations in understanding non-verbal deictic expressions. However, as in other studies, the tasks included in these experiments were structured and it is a possibility that these individuals show more marked difficulties in understanding these deictic expressions when in more natural and flexible contexts.

Finally, chapter 6 examined the use and understanding of non-verbal interpersonal expressions in individuals with autism. This study was based on two previous studies, which had examined aspects of non-verbal communication in individuals with autism when conversing with another person (Tantam, Holmes & Cordess, 1993; Capps, Kehres, & Sigman, 1999). These studies suggest that individuals with autism use fewer interpersonal expressions, like looks to the other person or shakes and nods of the head, when their conversational partner is talking, but not when they are talking.

The results of this study confirmed the suggestion that individuals with autism use interpersonal non-verbal expressions in conversations with other people. However, they seem to use fewer interpersonal expressions when another person is talking, as opposed to when they are talking. In addition, the results of this study suggest that there might be aspects of impaired non-inferential role-taking in individuals with autism, that are not only reflected in the ways in which they use these expressions with other people, but also in the ways in which other people use these expressions when interacting with them. Moreover, this study used novel and promising measures to examine subjective aspects of interpersonal engagement, revealing possible impairments among individuals with autism in the more subjective processes of interpersonal engagement underlying conversations.

To conclude, the studies reported in this thesis have provided new and suggestive evidence about strengths and limitations that individuals with autism might have in both conceptual and non-inferential role-taking.

7.5 Limitations of the studies and future investigations.

Three studies on narrative role-taking, deixis and non-verbal interpersonal communication were included in this thesis. Although these studies were carefully designed to examine aspects of role-taking in individuals with autism, they have some limitations.

The first aspect to be considered, is the procedure used for diagnosing the participants with autism included in these studies. One difficulty when diagnosing autism, is the wide variety of clinical features that might appear in these individuals. In addition, the quality of these features also varies considerably. For example, “lack of social or emotional reciprocity” (an item included in the Diagnostic and Statistical Manual of Mental Disorders, DSM-IV, 1994; See Appendix 1) can vary in degree, and even some children who show this disorder may display social and emotional reciprocity in different situations.

All the participants with autism included in the studies of this thesis fulfilled diagnostic criteria for autism according to the Diagnostic and Statistical Manual of Mental Disorders, (DSM-IV, 1994) and the Childhood Autism Rating Scale of Schopler, Reichler, & Renner (CARS, 1988; See Appendix 2). Although these measures are widely used, there are other observational measures that researchers and clinicians use to diagnose autism in a more systematic and in depth way (e.g. the ADOS). Also, the participants in the present set of studies were primarily functioning in the delayed range of cognitive ability. Therefore the children included in these samples might differ from the children with autism included in other research studies.

In addition, the participants with autism were group-matched with non-autistic participants according to chronological age and language ability, derived from the participants’ performance

on the British Picture Vocabulary scale (BPVS: Dunn, Dunn and Whetton, 1982). This type of matching increases the likelihood that group differences are indeed autism-specific (Hobson, 1991), for the reason that individuals with autism perform better on non-verbal than verbal tasks. Although the British Picture Vocabulary Scale is a test of single word comprehension, it has been reported to be highly and reliably associated with scores on the verbal sub-tests of the Wechsler Scales of Intelligence (Bartak *et al.* 1975; Lockyer and Rutter, 1970). Although it does not provide a comprehensive measure of all aspects of linguistic understanding, it has proven useful in a number of studies for establishing matched groups of participants with and without autism. It seemed, therefore, an appropriate matching procedure for the purpose of this thesis.

One of the limitations when matching according to performance on the BPVS, is that the individuals with autism are likely to perform better than non-autistic individuals on non-verbal tests (Hobson *et al.* 1988a), such as the Raven's matrices test. Thus, by selecting this type of matching one takes a conservative approach with regard to non-verbal ability, in that the participants with autism might have had superior non-verbal abilities relative to their matched control participants.

This type of matching was appropriate in the studies of narrative role-taking and deixis. Both studies included verbal tasks, where it was important to establish that the two groups of participants were well matched according to their linguistic ability. In spite of this matching procedure, differences between the two groups were expected in linguistic aspects of the participants' performance, for the reason that these aspects were predicted to be specifically impaired in autism. However, one task of the deixis study examined non-verbal aspects of deixis. Even though the participants with autism might have had superior non-verbal abilities than the control participants, the participants with autism nevertheless performed poorly on this task in comparison to controls, suggesting that the matching according to verbal ability was appropriate.

The last study was different from the other two studies in that it examined non-verbal expressions in these children. In spite of this, it was decided to match according to language ability because of the nature of the task, an interview where the participants were asked questions and had to talk about themselves. In this way, matching according to non-verbal abilities would have resulted in a control group with higher linguistic skills, and therefore any differences in non-verbal aspects of the task could have been due to differences in their verbal responses across the interview, and not due to specificity of autism. In spite of the verbal matching, results showed that the two groups of participants of this study were significantly different in the use of some non-verbal expressions.

It would be advantageous if future research in this domain might include a further control group of typically developing children, matched with the two atypically groups according to verbal mental age. There are two specific benefits that come from such an approach. Firstly, certain of the present tasks, and specifically the tests of understanding and producing deictic terms, are novel. Therefore, by administering the tests with typically developing young children, and relating the results to other evidence of the children's abilities, one can assess how effective the experimental arrangements are in assessing the abilities in question. Secondly, the results would shed light on group contrasts between typically developing and mentally retarded participants, and this would give indication not only of the effects of mental retardation on task performance, but also clarify further the specific contribution of the diagnosis of autism.

However, it was decided not to pursue this approach in the present study, for three reasons. Firstly, our principal concern was to focus on the contrast between the group with mental retardation and the group with autism, since it is this comparison that yields specific evidence of the contribution of autism *per se*, given that our participants all suffered from mental retardation in some degree. Secondly, the typical children would have been much younger, and this would

have introduced additional influences on their performance such as shyness and distractibility, which might have obscured the comparisons with other groups. For example, in the non-verbal communication study, young children might have become very self-conscious in talking with an adult stranger about themselves, and this could easily affect their non-verbal communication. Thirdly, there was a time constraint, given the substantial numbers of tasks administered.

It is also important to note that one additional limitation of these studies is the small samples used. Although studies with appropriately matched participants and carefully designed tasks can show group differences when they are clearly present, it is also the case that statistical power to show group differences, especially when the effect size is small, is limited by small sample size. Therefore, there is the likelihood of showing no group differences, when they are, indeed, present. For example, Experiment 3 of the deixis study, revealed group differences in understanding non-verbal deictic terms, but not in understanding verbal deictic expressions. However, the distribution of the participants with autism in the verbal deictic task showed an 'almost significant' difference, that might have become significant with a bigger sample. More research is needed to examine the areas of research chosen for this thesis with bigger samples.

Further, the results of these tasks need to be considered cautiously, for the reason that the participants of the selected samples might not be representative of the whole autistic spectrum. Also, the control participants had mental retardation, and may not represent how well typically developing children would perform.

Another limitation of these studies concerns the design of appropriate control and index tasks that measure the specific abilities examined in these children. The first thing to consider is that the measures used in the studies were reliable. All the measures were rated by two independent raters (at least one of whom was blind to diagnosis of the participants and hypothesis of the studies) and

were found reliable. However, the study of non-verbal communication selected only one minute of the interview, out of the total three minutes, to be rated for reliabilities, and although the measure were found reliable one needs to consider the possibility of getting lower reliabilities if the three minutes of the interview had been selected.

The task included in the narrative role-taking study was a semi-structured task in which the stories that the participants produced were the focus of study. Some aspects of the participants' stories were considered measures of conceptual role-taking. In this way, perspective-taking was measured by examining aspects of what the participants said in relation to the role and/or the perspective of one story character. To establish that any difference between the two groups of participants in the latter measure was due to specific difficulties encountered by participants with autism in role-taking, and not due to other task demands, a control 'measure' was selected. Co-ordination of story content was considered to be an ability that is cognitively based, and which was not expected to be impaired in individuals with autism. The specificity of impairment in aspects of conceptual role-taking of this task was confirmed with the participants with autism performing significantly less well on perspective taking than the control participants, but equally well on co-ordination of story content.

However, more studies are needed to examine the possible limitations that individuals with autism might have when adopting the role of another person, as opposed to a story character. Thus, it might be possible to establish whether there might be other difficulties in 'pretend' contexts. In addition, it would prove very useful to do another study where participants with autism take the role of a character, where a theory of mind task is also administered. In this case it would be possible to examine whether limitations in conceptual role-taking are related to limited understanding of mental state terms in individuals with autism.

Next, I shall review the design of the tasks included in the experiments of the deixis study. To begin with, the majority of these tasks appeared to be measuring deictic use and understanding. Experiment 1 examined the production of both verbal and non-verbal deictic expressions. This task proved to be well designed in that it elicited the use of deictic expressions in the participants of this study. However, no control condition was included. A control condition would have proved useful if significant differences had been found between the two groups in the use of these expressions, in order to establish that their lack of use of these expressions was not due to a general difficulty in communicating other messages to other people. However, both groups of participant were found to be proficient in the use of these measures.

Some limitations were found with regard to Experiment 2 (which examined comprehension of the terms 'come' and 'bring'), which did not include a control task. In this task, the participants were given only four opportunities to show comprehension of the deictic terms. In addition, the probability of responding by chance was one out of two on each trial. The majority of participants with autism responded correctly on three out of four trials, compared to the majority of control participants who responded correctly on all four trials. Thus, it is difficult to know whether the level achieved by the children with autism might be due to chance, given the probability of guessing correctly.

In spite of the above limitations, the majority of the experiments included in the deixis study appeared to have appropriate levels of difficulty, and control measures or conditions established that specific aspects of the tasks presented difficulties for the children with autism. However, more research is needed to examine whether individuals with autism use and understand deictic terms in other contexts, perhaps less structured than in these tasks. It would be very interesting to examine the use and understanding of deictic expression of individuals with autism in natural situations. Moreover, longitudinal studies in this area with young children with autism would

allow one to examine how young children acquire deixis, and which social and interpersonal process are involved in deictic understanding. Further, if indeed there are delays and/or alternative routes to the achievement of deictic understanding among persons with autism, longitudinal studies might reveal the specific nature of this potentially atypical developmental pathway. Longitudinal studies of deictic language development could potentially shed some light on the interpersonal processes involved in the usual route to the achievement of deixis, which may be impaired in individuals with autism.

The last study of this thesis examined three minutes of an interaction, between participants with and without autism during a conversation with another person. In this study, the control conditions were found in specific parts of the interactions, for example, significant differences were predicted, between the participants with autism and the control participants, in the use of some non-verbal expressions when the interviewer was talking, but not when he was listening. In this way, it was possible to establish that the results were not simply the reflection of a 'nodding difficulty', but were manifestations of a relational abnormality.

One limitation of this study is that the context of the interaction was an interview, from which a small sample of time (three minutes) was selected. Future studies should examine aspects of the use of non-verbal expressions in individuals with autism in other contexts. It is possible that a context more social and natural than an interview, like a meal or an informal chat with a friend or a relative, for instance, could reveal more striking abnormal use of non-verbal expressions in individuals with autism.

It would also be very revealing to further examine the relationship between behavioural and subjective measures. Moreover, the use of the subjective measures might prove in the future to be very useful to understand the meaning of behavioural expressions used by individuals with

autism. For example, it would be very interesting to examine behavioural and subjective aspects of interpersonal engagement, in individuals with autism, when interacting with different people, for example a person who displays an engaging and social attitude, and a person whose attitude might be more neutral. In this case, the last interaction could be used as a control condition for possible effects of interpersonal processes, in the interactions of the participants (with and without autism) with the ‘engaging’ partner.

To conclude, the studies included in this thesis were effective in revealing group differences in relation to specific abilities that were expected to be impaired in individuals with autism. In addition, those tasks that found few group differences, like the tasks of the deixis study, reached neither ceiling nor floor effect, suggesting that individuals with autism might be proficient in the abilities examined in these tasks, albeit proficient in subtly different ways than control participants.

7.6 Conclusion

This thesis examined aspects of both conceptual and non-inferential role-taking in individuals with autism, which might be limited or intact. In particular, it investigated aspects of role-taking through the examination of narrative role-taking, deixis and interpersonal non-verbal communication.

The underlying hypothesis of this thesis has been that basic non-inferential role-taking processes, related to the way we identify with the attitudes and feelings of other people, are relatively lacking in individuals with autism.

This thesis has provided evidence to suggest that individuals with autism have limitations in role-taking that are better explained by an impairment in interpersonal, and non-inferential, aspects of role-taking, than by an account that focuses upon cognitive/conceptual limitations. In particular, it has highlighted the possible explanatory role for an impairment in identification in autism, a process that has been suggested underlies interpersonal interactions, and which might play an important part in the ways in which people engage with each other through social connectedness.

Yet we need to recognise that certain degrees of role-taking can be achieved by individuals with autism. Intact social and cognitive capacities provide routes to guide individuals with autism to reach some, albeit relatively limited, sensitivity to, and understanding of, the subjective perspectives of others.

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Appendix 1. Diagnostic criteria for autistic disorder

Diagnostic and Statistical Manual of Mental Disorders, 4th edition. A.P.A. (1994)

1. A total of six (or more) items from **A**, **B**, and **C**, with at least two from **A**, and one each from **B** and **C**.

A. Qualitative impairment in social interaction, as manifest by at least two of the following:

- i* marked impairment in the use of multiple non-verbal behaviours such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
- ii* failure to develop peer relationships appropriate to developmental level
- iii* a lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by a lack of showing, bringing, or pointing out objects of interest)
- iv* lack of social or emotional reciprocity

B. Qualitative impairments in communication, as manifest by at least one of the following:

- i* delay in, or total lack of, the development of spoken language (not accompanied by an attempt to compensate through alternative modes such as gesture or mime)
- ii* in individuals with adequate speech, marked impairment in the ability to initiate or sustain a conversation with others
- iii* stereotyped and repetitive use of language or idiosyncratic language
- iv* lack of varied, spontaneous make-believe play or social imitative play appropriate to developmental level

C. Restricted repetitive and stereotyped patterns of behaviour, interests, and activities, as manifest by at least one of the following:

- i* encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal either in intensity or focus
- ii* apparently inflexible adherence to specific, non-functional routines or rituals
- iii* stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or complex whole-body movements)
- iv* persistent preoccupation with parts of objects

2. Delays or abnormal functioning in at least one of the following areas, with onset prior to age 3 years: (a) social interaction; (b) language as used in social communication; or (c) symbolic or imaginative play.

3. The disturbance is not better accounted for by Rett's Disorder or Childhood Disintegrative Disorder.

Appendix 2. Childhood Autism Rating Scale

I. Relating to People

1	NO EVIDENCE OF DIFFICULTY OR ABNORMALITY IN RELATING TO PEOPLE: The child's behaviour is appropriate for her/his age. Some shyness, fussiness, or annoyance at being told what to do may be observed, but not to any atypical degree.
1.5	
2	MILDLY ABNORMAL RELATIONSHIPS: The child may avoid looking at the adult in the eye, avoid the adult or become fussy if interaction is forced, be excessively shy, not be as responsive to the adult as is typical, or cling to parents somewhat more than most children of the same age.
2.5	
3	MODERATELY ABNORMAL RELATIONSHIPS: The child shows aloofness (seems unaware of adult) at times. Persistent and forceful attempts are necessary to get the child's attention at times. Minimal contact is initiated by the child.
3.5	
4	SEVERELY ABNORMAL RELATIONSHIPS: The child is consistently aloof or unaware of what the adult is doing. She/he almost never responds or initiates contact with the adult. Only the most persistent attempts to get the child's attention have any effect.

II. Imitation

1	APPROPRIATE IMITATION: The child can imitate sounds, words, and movements which are appropriate for her/his skill level.
1.5	
2	MILDLY ABNORMAL IMITATION: The child imitates simple behaviours such as clapping or single verbal sounds most of the time; occasionally, imitates only after prodding or after a delay.
2.5	
3	MODERATELY ABNORMAL IMITATION: The child imitates only part of the time and requires a great deal of persistence and help from the adult; frequently imitates only after a delay.
3.5	
4	SEVERELY ABNORMAL IMITATION: The child rarely or never imitates sound, words, or movements even with prodding and assistance from the adult.

III Emotional Response

1	AGE-APPROPRIATE AND SITUATION-APPROPRIATE EMOTIONAL RESPONSES: The child shows the appropriate type and degree of emotional response as indicated by a change in facial expression, posture, and manner.
1.5	
2	MILDLY ABNORMAL EMOTIONAL RESPONSES: The child occasionally displays a somewhat inappropriate type or degree of emotional reactions. Reactions are sometimes unrelated to the objects or events surrounding them.
2.5	
3	MODERATELY ABNORMAL EMOTIONAL RESPONSES: The child shows definite signs of inappropriate type and/or degree of emotional response. Reactions may be quite inhibited or excessive and unrelated to the situation; may grimace, laugh, or become rigid even though no apparent emotion-producing objects or events are present.
3.5	
4	SEVERELY ABNORMAL EMOTIONAL RESPONSES: Responses are seldom appropriate to the situation; once the child gets in a certain mood, it is very difficult to change the mood. Conversely, the child may show wildly different emotions when nothing has changed.

IV. Body Use

1	AGE-APPROPRIATE BODY USE: The child moves with the same ease, agility, and co-ordination of a normal child of the same age.
1.5	
2	MILDLY ABNORMAL BODY USE: Some minor peculiarities may be present, such as clumsiness, repetitive movements, poor co-ordination, or the rare appearance of more unusual movements.
2.5	
3	MODERATELY ABNORMAL BODY USE: Behaviours that are clearly strange or unusual for a child of this age may include strange finger movements, peculiar finger or body posturing, staring or picking at the body, self-directed aggression, rocking, spinning, finger wiggling, or toe-walking.
3.5	
4	SEVERELY ABNORMAL BODY USE: Intense or frequent movements of the type listed above are signs of severely abnormal body use. These behaviours may persist despite attempts to discourage them or involve the child in other activities.

V. Object Use

1	APPROPRIATE USE OF, AND INTEREST IN, TOYS AND OTHER OBJECTS: The child shows normal interest in toys and other objects appropriate for his or her skill level and uses these toys in an appropriate manner.
1.5	
2	MILDLY INAPPROPRIATE INTEREST IN, OR USE OF TOYS AND OTHER OBJECTS: The child may show atypical interest in a toy or play with it in an inappropriate childish way (e.g., banging or sucking on the toy).
2.5	
3	MODERATELY INAPPROPRIATE INTEREST IN, OR USE OF TOYS AND OTHER OBJECTS: The child may show little interest in toys or other objects, or may be preoccupied with using an object or toy in some strange way. He or she may focus on some insignificant part of a toy, become fascinated with light reflecting off the object, repetitively move some part of the object, or play with one object exclusively.
3.5	
4	SEVERE INAPPROPRIATE INTEREST IN, OR USE OF TOYS AND OTHER OBJECTS: The child may engage in the same behaviour as above, with greater frequency and intensity. The child is difficult to distract when engaged in these inappropriate activities.

VI. Adaptation to Change

1	AGE APPROPRIATE RESPONSE TO CHANGE: While the child may notice or comment on changes in routine, he or she accepts these changes without undue distress.
1.5	
2	MILD ABNORMAL ADAPTATION TO CHANGE: When an adult tries to change tasks the child may continue the same activity or use the same materials.
2.5	
3	MODERATE ABNORMAL ADAPTATION TO CHANGE: The child actively resists changes in routine, tries to continue the old activity, and is difficult to distract. He or she may become angry and unhappy when an established routine is altered.
3.5	
4	SEVERELY ABNORMAL ADAPTATION TO CHANGE: The child shows severe reactions to change. If a change is forced, he or she may become extremely angry or uncooperative and respond with tantrums.

VII. Visual Response

1	AGE APPROPRIATE VISUAL RESPONSE: The child's visual behaviour is normal and appropriate for that age. Vision is used together with other senses as a way to explore a new object.
1.5	
2	MILDLY ABNORMAL VISUAL RESPONSE: The child must be occasionally reminded to look at objects. The child may be interested in looking at mirrors or lighting than peers, may occasionally stare off into space, or may also avoid looking people in the eye.
2.5	
3	MODERATELY ABNORMAL VISUAL RESPONSE: The child must be reminded frequently to look at what he/she is doing. He or she may stare into space, avoid looking people in the eye, look at objects from an unusual angle, or hold objects very close to the eyes.
3.5	
4	SEVERELY ABNORMAL VISUAL RESPONSE: The child consistently avoids looking at people or certain objects and may show extreme forms of other visual peculiarities described above.

VIII. Listening Response

1	AGE APPROPRIATE LISTENING RESPONSE: The child's listening behaviour is normal and appropriate for age. Listening is used together with other senses.
1.5	
2	MILDLY ABNORMAL LISTENING RESPONSE: There may be some lack of response, or mild overreaction to certain sounds. Responses to sounds may be delayed, and sounds may need repetition to catch the child's attention. The child may be distracted by extraneous sounds.
2.5	
3	MODERATELY ABNORMAL LISTENING RESPONSE: The child's response to sounds vary; often ignores a sound the first few times it is made; may be startled or cover ears when hearing some everyday sounds.
3.5	
4	SEVERELY ABNORMAL LISTENING RESPONSE: The child overreacts and/or underreacts to sounds to an extremely marked degree, regardless of the type of sound.

IX. Taste, Smell, and Touch Response and Use

1	NORMAL USE OF, AND RESPONSE TO, TASTE, SMELL, AND TOUCH: The child explores new objects in an age appropriate manner, generally by feeling and looking. Taste or smell may be used when appropriate. When reacting to minor, everyday pain, the child expresses discomfort but does not overreact.
1.5	
2	MILDLY ABNORMAL USE OF, AND RESPONSE TO, TASTE, SMELL, AND TOUCH: The child may persist in putting objects in his or her mouth; may smell or taste inedible objects; may ignore or overreact to mild pain that a normal child would express as discomfort.
2.5	
3	MODERATELY ABNORMAL USE OF, AND RESPONSE TO, TASTE, SMELL, AND TOUCH: The child may be moderately preoccupied with touching, smelling, or tasting objects or people. The child may either react too much or too little.
3.5	
4	SEVERELY ABNORMAL USE OF, AND RESPONSE TO, TASTE, SMELL, AND TOUCH: The child is preoccupied with smelling, tasting, or feeling objects more for the sensation than for normal exploration or use of the objects. The child may completely ignore pain or react very strongly to slight discomfort.

X. Fear or Nervousness

1	NORMAL FEAR OR NERVOUSNESS: The child's behaviour is appropriate to both the situation and to his or her age.
1.5	
2	MILDLY ABNORMAL FEAR OR NERVOUSNESS: The child occasionally shows too much or too little fear or nervousness compared to the reaction of a normal child of the same age in a similar situation.
2.5	
3	MODERATELY ABNORMAL FEAR OR NERVOUSNESS: The child shows either quite a bit more or quite a bit less fear than is typical even for a younger child in a similar situation.
3.5	
4	SEVERELY ABNORMAL FEAR OR NERVOUSNESS: Fears persist even after repeated experience with harmless events or objects. It is extremely difficult to calm or comfort the child. The child may, conversely, fail to show appropriate regard for hazards which other children of the same age avoid.

XI. Verbal Communication

1	NORMAL VERBAL COMMUNICATION, AGE AND SITUATION APPROPRIATE.
1.5	
2	MILDLY ABNORMAL VERBAL COMMUNICATION: Speech shows overall retardation. Most speech is meaningful; however, some echolalia or pronoun reversal may occur. Some peculiar words or jargon may be used occasionally.
2.5	
3	MODERATELY ABNORMAL VERBAL COMMUNICATION: Speech may be absent. When present, verbal communication may be a mixture of some meaningful speech and some peculiar speech such as jargon, echolalia, or pronoun reversal. Peculiarities in meaningful speech include excessive questioning or preoccupation with particular topics.
3.5	
4	SEVERELY ABNORMAL VERBAL COMMUNICATION: Meaningful speech is not used. The child may make infantile squeals, weird or animal-like sounds, complex noises approximating speech, or may show persistent, bizarre use of some recognisable words or phrases.

XII. Non-verbal Communication

1	NORMAL USE OF NON-VERBAL COMMUNICATION, AGE AND SITUATION APPROPRIATE.
1.5	
2	MILDLY ABNORMAL USE OF NON-VERBAL COMMUNICATION: Immature use of non-verbal communication; may only point vaguely, or reach for what he / she wants, in situations where same-age child may point or gesture more specifically to indicate what he or she wants.
2.5	
3	MODERATELY ABNORMAL USE OF NON-VERBAL COMMUNICATION: The child is generally unable to express needs or desires non-verbally, and cannot understand the non-verbal communication of others.
3.5	
4	SEVERELY ABNORMAL USE OF NON-VERBAL COMMUNICATION: The child only uses bizarre or peculiar gestures which have no apparent meaning, and shows no awareness of the meanings associated with the gestures or facial expressions of others.

XIII. Activity Level

1	NORMAL ACTIVITY LEVEL FOR AGE AND CIRCUMSTANCE: The child is neither more active or less active than a normal child of the same age in a similar situation.
1.5	
2	MILDLY ABNORMAL ACTIVITY LEVEL: The child may either be mildly restless or somewhat "lazy" and slow moving at times. The child's activity level interferes only slightly with his or her performance.
2.5	
3	MODERATELY ABNORMAL ACTIVITY LEVEL: The child may be quite active and difficult to restrain. He or she may have boundless energy and may not go to sleep readily at night. Conversely, the child may be quite lethargic, and need a great deal of prodding to get him or her to move about.
3.5	
4	SEVERELY ABNORMAL ACTIVITY LEVEL: The child exhibits extremes of activity or inactivity and may even shift from one extreme to the other.

XIV. Level and Consistency of Intellectual Response

1	INTELLIGENCE IS NORMAL AND REASONABLY CONSISTENT ACROSS VARIOUS AREAS: The child is as intelligent as typical children of the same age and does not have any unusual skills or problems.
1.5	
2	MILDLY ABNORMAL INTELLECTUAL FUNCTIONING: The child is not as smart as typical children of the same age; skills appear fairly evenly retarded across all areas.
2.5	
3	MODERATELY ABNORMAL INTELLECTUAL FUNCTIONING: In general, the child is not as smart as typical children of the same age; however, the child may function nearly normally in one or more intellectual areas.
3.5	
4	SEVERELY ABNORMAL INTELLECTUAL FUNCTIONING: While the child generally is not as smart as the typical child of the same age, he or she may function even better than the normal child of the same age in one or more areas.

XV. General Impressions

1	NO AUTISM: The child shows none of the symptoms characteristic of autism.
1.5	
2	MILD AUTISM: The child shows only a few symptoms or only a mild degree of autism.
2.5	
3	MODERATE AUTISM: The child shows a number of symptoms or a moderate degree of autism.
3.5	
4	SEVERE AUTISM: The child shows many symptoms or an extreme degree of autism.

Total Score = Key: 15 to 29 - Non-Autistic / 30 to 36 - Mildly-Moderately Autistic / 37 to 60 - Severely Autistic

Schopler, E., Reichler, R.J. & Renner, B.R. (1988). The Childhood Autism Rating Scale (CARS). Los Angeles, CA: Western Psychological.

Appendix 3. Rules for calculating mean length of utterance (MLU)

1. Start with the second page of the transcription unless that page involves a recitation of some kind. In this latter case start with the first recitation-free stretch. Count the first 100 utterances satisfying the following rules. (A 50-utterance sample may be used for preliminary estimate.)
2. Only fully transcribed utterances are used; none with blanks. Portions of utterances, entered in parentheses to indicate doubtful transcription, are used.
3. Include all exact utterance repetitions (marked with a plus sign in records). Stuttering is marked as repeated efforts at a single word; count the word once in the most complete form produced. In the few cases where a word is produced for emphasis or the like (*no, no, no*) count each occurrence.
4. Do not count such fillers as *mm* or *oh*, but do count *no*, *yeah*, and *hi*.
5. All compound words (two or more free morphemes), proper names, and ritualised reduplications count as single words. Examples: *birthday*, *rackety-boom*, *choo-choo*, *quack-quack*, *night-night*, *pocketbook*, *see saw*. Justification is that no evidence that the constituent morphemes function as such for these children.
6. Count as one morpheme all irregular pasts of the verb (*got*, *did*, *went*, *saw*). Justification is that there is no evidence that the children relates these to present forms.
7. Count as one morpheme all diminutives (*doggie*, *mommie*) because these children at least do not seem to use the suffix productively. Diminutives are the standard forms used by the child.
8. Count as separate morphemes all auxiliaries (*is*, *have*, *will*, *can*, *must*, *would*). Also all cantenatives: *gonna*, *wanna*, *hafta*. These latter counted as single morphemes rather than as *going to* or *want to* because evidence is that they function so for the child. Count as separate morphemes all inflections, for example, possessives {s}, plural {s}, third person singular {s}, regular past {d}, progressive {ing}.
9. The range count follows the above rules but is always calculated for the total transcription rather than for 100 utterances.

Brown (1973; p. 54)

Appendix 4. Inter-rater reliability coefficients

Interpretation of Kappa Coefficient

Coefficient	Strength of Agreement*
<0.00	Poor
0.00 - 0.20	Slight
0.21 - 0.40	Fair
0.41 - 0.60	Moderate
0.61 - 0.80	Substantial
0.81 - 1.00	Almost Perfect

*Landis and Koch (1977)

Interpretation of Intraclass Correlation Coefficient

Coefficient	Strength of Agreement*
<0.40	Poor
0.40 - 0.59	Fair
0.60 - 0.74	Good
> 0.74	Excelent

* Feiss (1981); Cicchetti and Sparrow (1981)